FINAL Immediate Response Action (IRA) Status Report 14, IRA Completion Statement, Phase IV Final Inspection Report and Completion Statement, and Phase V Status Report

Cape Cod Gateway Airport

Hyannis, Massachusetts

RTN 4-26347

April 2024

Prepared for:
Cape Cod Gateway Airport
480 Barnstable Road Hyannis,
MA 02840

Prepared by:
Horsley Witten Group, Inc.
90 Route 6A
Sandwich, MA 02563

IMMEDIATE RESPONSE ACTION (IRA) STATUS REPORT 14, IRA COMPLETION STATEMENT, PHASE IV FINAL INSPECTION REPORT AND COMPLETION STATEMENT, AND PHASE V STATUS REPORT

CAPE COD GATEWAY AIRPORT
480 BARNSTABLE ROAD
HYANNIS, MASSACHUSETTS
RELEASE TRACKING NUMBER 4-26347

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1.0 INTRODUCTION

The Horsley Witten Group, Inc. (HW) has been retained by the Cape Cod Gateway Airport (the "Airport") to prepare this Immediate Response Action (IRA) Status Report 14, IRA Completion Statement, Phase IV Final Report and Completion Statement, and Phase V Status Report (the "Report") for its property located at 480 Barnstable Road, Hyannis, Massachusetts. For the purpose of this report, the term "Airport" specifically refers to the Cape Cod Gateway Airport property located at 480 Barnstable Road, as set forth above, and the term "Disposal Site" refers to the area impacted by the release of oil and/or hazardous material (OHM) subject to Release Tracking Number (RTN) 4-26347. A Site Locus Map and the Estimated Disposal Site Map are provided as Figures 1 and 2.

The Report focuses on the implementation of the chosen remedial action alternative to address a release of per- and poly-fluoroalkyl substances (PFAS) in soil and groundwater relating to the Airport's historic use of a fluorotelomer based aqueous film forming foam (AFFF). As documented in the report titled *Final Phase IV Implementation of the Selected Remedial Action Alternative* prepared by HW and submitted to the Massachusetts Department of Environmental Protection (MassDEP) in January 2023 (the "Final Phase IV Report"), the chosen remedial action to achieve either a Permanent or Temporary solution are soil caps to prevent and/or reduce leaching of PFAS into groundwater, and treatment at the Maher Wells to provide drinking water to the community that meets the regulatory standards promulgated by the MassDEP. The Airport is compensating the Town of Barnstable for its allocated portion of responsibility for groundwater treatment that is occurring at the Maher Wells.

This Report has been prepared in accordance with the requirements of the Massachusetts Contingency Plan (MCP). Consistent with the *Final Public Involvement Plan* for the Airport dated September 16, 2019, all persons identified on Table 1, Community Notification List, were notified of the availability of this Report.

Considering this is the last phased report until a Permanent or Temporary Solution is submitted, a IRA Status Report 14, DRAFT IRA Completion Statement, and DRAFT Phase IV Completion Report was submitted to MassDEP and notifications were distributed to all persons identified on Table 1, Community Notification List October 11, 2023. The Airport send a subsequent notification on

November 13, 2023 to all persons identified on Table 1, Community Notification List, about an in person meeting on December 18, 2023. After the meeting, the Airport provided an additional 45-day review period for the public and MassDEP to review the PFAS related investigation completed by the Airport. A Phase V Status report has also been included in this Report due to the extended comment period and the required regulatory submittals needed to satisfy the requirements of the Massachusetts Contingency Plan. Questions and Comments received by the public (the Siera Club, Hyannis Park Civic Association and Mr. Thomas Cambareri) are detailed below. Copies of the submitted questions/comments are included in Appendix A.

Sierra Club

(1) *Acknowledgment that the Airport's records regarding historical AFFF use are inadequate and that its fingerprinting and source attribution conclusions, which are presented as authoritative, are based on limited and highly caveated analytical findings.*

As detailed in the Revised Phase II Comprehensive Site Assessment dated January 2022 and prepared by HW ("Phase II Report"), the Airport has a complete record of AFFF purchase records going back 20 years that clearly document the quantity and type of AFFF usage at the Airport. Additionally, the Airport's analytical data set includes over 200 groundwater samples collected from 2016 to 2024. These groundwater samples along with multiple other lines of evidence including groundwater flow direction, contaminant fate and transport, groundwater modeling and environmental forensics all support the fact that the Airport PFAS plume impacted the Maher Wells in 2022. Forensics also supports the chemical signature as being related to fluorotelomer based AFFF, which corelates to the Airports purchase records. The analytical data was processed by a Massachusetts certified laboratory and is not limited or highly caveated. Additionally, environmental forensics is routinely utilized by environmental professionals for source identification and is not uncommon or unusual. At the October 2023 UMass Soils Conference, multiple case studies and scientific methods using PFAS forensics were presented by various consultants and regulatory agencies including MassDEP for source identification and differentiation.

(2) *Independent and transparent evaluation of the Airport's public assertions that AFFF handling and use at the airport did not become a source of PFAS contaminating the town's Maher wells until 2022.*

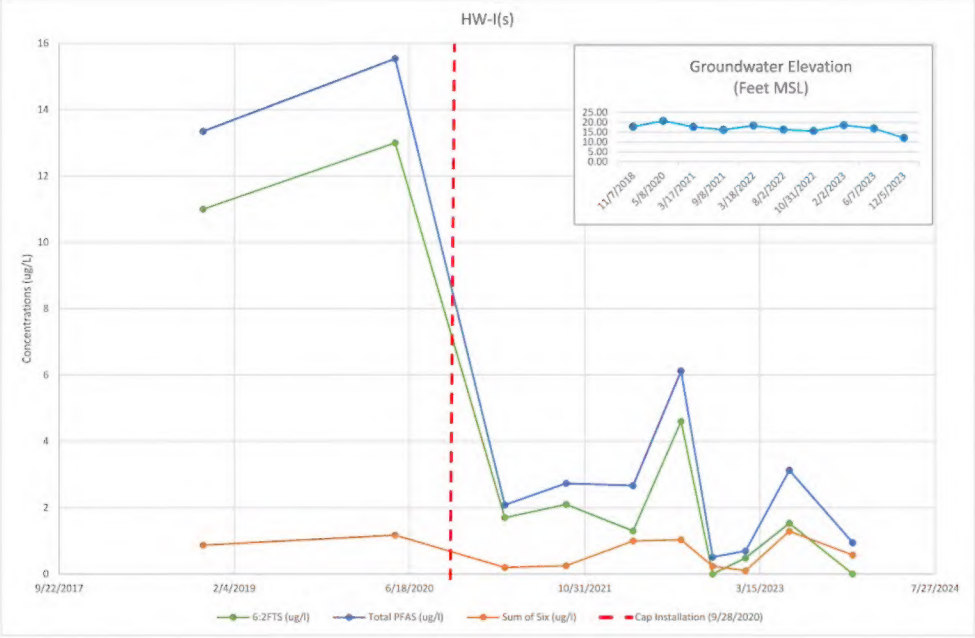
These details have been included in multiple reports that are available to the public at any time for review. MassDEP and the public have been given opportunities at various points in the regulatory timeline to review and comment on several of these reports including the Phase II, Phase III and Phase IV Reports. As previously stated, hundreds of analytical samples have been collected by the Airport in support of this determination which is also supported by hundreds of samples collected off-Airport by others.

Reports submitted to the MassDEP can be accessed at:

- https://flyhya.com/airport-info/pfas/
- https://eeaonline.eea.state.ma.us/EEA/FileViewer/Rtn.aspx?rtn=4-0026347

(3) *Commitment to investigate, understand, and mitigate historical and continuing PFAS-related health burdens imposed on designated environmental justice communities in the Hyannis area.*

The Airport is managing the PFAS plumes associated with its historical use of fluorotelomer based AFFF. The Airport is not required to investigate or remediate non-Airport related PFAS plumes. The Airport has controlled its PFAS source areas with engineered barriers ("caps") to reduce potential groundwater impacts. As presented in multiple IRA Status reports available on MassDEPs website and the Airport's website (see above), the caps have significantly reduced migration of PFAS from soil into groundwater (depicted below). The Airport is not responsible for controlling non-airport related PFAS plumes or soil impacts. It is the regulatory agencies and/or the Responsible Party(s) that will need to investigate sources that are outside of the Airport's responsibility. Additionally, the Airport's PFAS plume reached Maher Wells after the construction of the new treatment was completed and as such, no exposure to the community is believed to have occurred.



(4) *Development of a final cleanup solution involving removal of PFAS-contaminated soil at the town's airport as a "forever" source of risk to Hyannis-area communities.*

Removal of all PFAS impacted soil relating to the Airports historic use of AFFF is currently economically infeasible. As indicated in the Final Phase III Report dated June 2022 and prepared by HW (the "Phase III Report"):

"[T]he excavation of PFAS contaminated soils currently located below the two capped areas would result in approximately 3,000 trucks transporting approximately 105,000 tons of soil with an estimated transportation and disposal costs in excess of 75 million dollars. As such, large scale excavation is not justified by the benefits according to the Massachusetts Contingency Plan."

The Phase III Report concludes that the existing caps along with potential future limited excavation and/or capping, is the final remedy for managing PFAS impacted soil at the Airport and as approved by the state agencies overseeing the remediation process. The caps are inspected and groundwater data is collected every six months to document the effectiveness of the caps. This information is submitted to MassDEP every six months and is available online from MassDEP or the Airport's website.

Hyannis Park Civic Association

(1) *Yarmouth requires monitoring wells to be installed and monitored beyond the Maher Wells along the Yarmouth town line. We need assurances that the PFAS plumes are indeed contained before they reach our community. We need data that no overflow from the Maher wells exists now or in the future. The admission that the installed caps at the disposal sites are temporary begs the question—when can we expect a true remediation effort of these sites?*

As indicated in the Final Phase IV Report dated January 2023 and prepared by HW (the "Phase IV Report", the Airports PFAS plume is modeled to be below the regulatory standards as it passes by Maher Well 2 (ME-2). The Airports PFAS plume is less than the GW-3 standard which is protective of surface water. Additionally, monitoring wells beyond the Maher Wells is not necessary for the purposes of delineating the nature and extent of the Airport's PFAS plume consistent with the Massachusetts Contingency Plan. Installation of monitoring wells by Responsible Parties for non-Airport related PFAS sources in Yarmouth may be necessary. These additional wells would be the responsibility of others, not the Airport. As an example, of the 131 soil samples and 210 groundwater samples collected at the Airport to determine Airport responsibility, the highest concentration of PFAS Sum of 6 on Airport was 1.2902 micrograms per liter (ug/l). The MassDEP regulatory limit for Sum of 6 PFAS in GW-1 areas is 0.02 ug/l. Other off airport locations include the following and their associated PFAS laboratory levels collected to date:

- The Barnstable Fire Training Academy levels thus far collected were 320 ug/l,
- The Industrial Park area (Airport Road) was at 0.0574 ug/l, and
- The Rotary (near Wendy's) was at 0.0987 ug/l.

Additionally, the caps are being referred to as "temporary" until Phase V is complete, and a Permanent or Temporary Solution is achieved. As indicated in the Phase IV Report:

"Fluctuations in the concentration of PFAS is expected as the groundwater level rises and falls over the next several years and contaminants are flushed from the capillary fringe zone. After flushing is complete, concentrations associated with the Airports PFAS Plume are expected to decline. The effectiveness of the caps will be documented through the collection of groundwater samples until a Permanent or Temporary Solution can be achieved. The caps will be inspected twice annually and maintained as necessary until a Permanent or Temporary Solution can be achieved. Assuming that the future Permanent or Temporary Solution relies on the caps to maintain a level of no significant risk, the caps will be maintained and inspected in the future as part of an AUL".

The caps were designed consistent with the requirements of a permanent engineered barrier. A copy of the engineering design plans for the two caps are included in Appendix B of the Phase IV Report.

(2) *The question of an "orphaned" plume behind Wendy's needs addressing. It is not enough to say that some vague external source is the culprit. Clean it up.*

During it's investigation, the Airport identified several non-Airport PFAS related plumes that are located hydraulically upgradient, downgradient, and/or cross-gradient of the Airport but not on Airport property, thus from other industrial/commercial sites. These plumes are not related to the Airports PFAS plume and are the responsibility of others. These plumes have been brought to the attention of MassDEP and others by the Airport. If a Responsible Party can be identified by the MassDEP, they will issue a Notice of Responsibility requiring the Responsible Party to initiate investigation and cleanup activities. The Airport is not responsible for PFAS plumes relating to non-Airport sources. It is now in the hands of MassDEP to identify other sources and/or determine next steps.

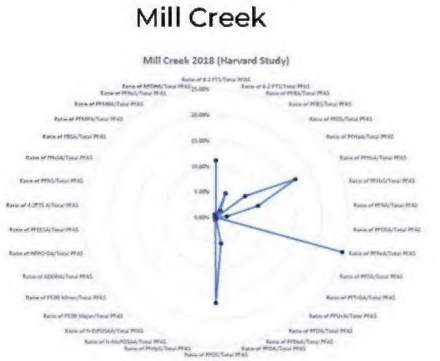
(3) *There seems no urgency on the part of the Airport or BFTA to collaborate toward a clean up solution of the BFTA's PFAS that exists on the Airport property. One would think that the Airport would be pushing for BFTA to clean it up. Certainly, the BFTA should take the blame. But where is the Airport's collaboration plan for the clean-up of contamination caused by BFTA?*

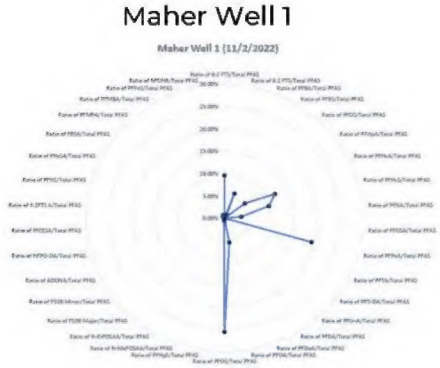
The BFTA is responsible for the investigation and cleanup of its PFAS plume consistent with the Massachusetts Contingency Plan. The treatment system at the Maher Wells provides safe drinking water to the Airport that meets the regulatory standards for PFAS. As such, the risk of PFAS exposure through drinking water by Airport staff and visitors is being managed by the treatment occurring at Maher Wells. It is not the Airport's responsibility to respond to PFAS contamination not related to the Airport PFAS plume. Additionally, all Airport data is available to

the public and to the BFTA for use in BFTA's own investigations. The Airport and the BFTA have separate Massachusetts Contingency Plan responses. Additionally, the BFTA has not advanced a remedial strategy that requires Airport collaboration as they currently are still progressing towards Phase II requirements of the Massachusetts Contingency Plan. The Airport is now advancing to Phase V.

(4) *Mill Creek remains a problem for both BFTA and the Airport. The Airport's signature compound has been detected in the Creek along with BFTA's fingerprint. Can we get a collaborative agreement that should a cost-effective solution present itself in the future, that both these source entities will pay for the clean-up? Yarmouth residents would like to see accountability for damages.*

The Airport's PFAS plume is below the MassDEP GW-3 standard in all locations, which is protective of potential discharges to surface water. Additionally, the forensic signature generated from the Harvard study in 2018 is not consistent with the airport PFAS plume. This is also supported by analytical data and modeling indicating that the Airport's plume didn't reach the Maher Wells until 2022. It is anticipated that the Airport plume will enter Mill Creek, but at concentrations below the GW-1 and GW-3 standards as predicted by the fate and transport models. Forensic signatures of Mill Creek, Maher Well 1, BFTA and the Airport are presented below.





As such, consistent with the Massachusetts Contingency Plan, the Airport's PFAS plume is not a risk to surface water. The Airport is not responsible for PFAS entering Mill Creek that may be above the GW-3 standard from others. Responsible parties associated with PFAS plumes impacting this area above regulatory criteria are not the responsibility of the Airport. This has been brought to the attention of MassDEP and others by the Airport. If a Responsible Party can be identified by the MassDEP, they will issue a Notice of Responsibility requiring the Responsible Party to initiate investigation and cleanup activities. The Airport is not responsible for PFAS plumes relating to non-Airport sources. It is now in the hands of MassDEP to determine next steps.

Thomas Cambareri

The following are responses to Mr. Cambareri's general comments on the investigations at the Airport and his specific questions on the information contained in the Report.

(1) *The Airport indicates that PFAS from the use of Aqueous Film Forming Foam (AFFF) began in the 1990s. That is a truncated period relative to the Airport's site history going back decades to its time as a Naval station in the 50's, a Presidential Airport for the Kennedy Summer White House in the 60's and a transportation hub for the rapid growth in the 70's and 80's. It seems reasonable to assume there was emergency response capability at the Airport prior to the 1990's. It also stands that AFFF equipment was stored and used on site, and staff was well trained during those decades. This earlier history is important given the broad impact of "forever" PFAS compounds in the Hyannis area community.*

As documented on page 8 of the Phase II:

- *Historical Airport purchase records indicate that a fluorotelomer-based AFFF (ChemGuard 3% mil spec) has been purchased by the Airport over the last twenty years, and interviews with staff indicated that this type of foam was also purchased as early as the 1980s. With the exception of the events detailed below, AFFF was not intentionally sprayed due to cost and limited supply of AFFF.*
    - *Further information regarding foam use was provided through interviews with Art Jenner and Bob Holzman who have worked at the Airport since the 1980's. Both are firefighters and first responders and stated that fluorotelomer based foam was purchased by the Airport since the 1980s. Additionally, according to the ITRC document titled "Aqueous Film-Forming Foam (AFFF)" dated August 2020, fluorotelomer-based AFFF has been available since the 1970s and other AFFF formulations have been available since the late 1960s.*

- *FAA regulations require a Tri-Annual Drill which is a full-scale live exercise that simulates a major airport disaster to test the emergency coordination and response skills of the Airport*

and other first responders. AFFF was used at the Deployment Area between 1994 and 2004 for triannual drills and between 2004 and 2015 for annual AFFF mixture testing. Two firefighting personnel, employed by the Airport since the 1980's, indicated that foam was not used prior to 1991 due to cost, limited availability, and lack of an FAA requirement mandating foam usage.

The use of the Airport by the Navy in the 50s is irrelevant to the PFAS investigation since AFFF is reported by ITRC to have been developed in the late 1960's as indicated above. Additionally, documents suggest that President Kenedy flew into Otis and not the Cape Cod Gateway Airport.

As indicated above, the Airport did have emergency capabilities prior to 1991 and two fire fighters who have worked at the Airport since the 1980s indicated that AFFF was not used for non-emergencies prior to 1991 due to cost, limited availability, and lack of an FAA requirement mandating AFFF usage for emergency use training (Mass Casualty Incident Training) and verifying AFFF consistency. Additionally, as indicated in the revised Phase II Report:

- *The current ARFF/SRE Building was constructed in 1996, and PFAS is assumed to have been released in this area through what is presumed to be incidental spillage, dripping from fire hoses hung to dry, and cleaning of equipment in the event of accidentally engaging the foam pump button. Prior to 1996, the Airport fire truck was housed in the former ARFF/SRE Building located adjacent to the former terminal along the North Ramp. This building was demolished in 2011.*

- *Based on interviews with two firefighting staff who have worked at the Airport since the 1980s, AFFF containers were also stored in this building. The building did have two floor drains that were closed prior to 1997 (discharge location unknown) and a third-floor drain that was traced to a catch basin that discharged to Upper Gate Pond. The former building was surrounded in its entirety by asphalt and, according to stormwater plans from 1999, storm drains in proximity to the building also discharge to Upper Gate Pond. Investigation conducted in the vicinity of the former ARFFF/SRE Building did not identify any of the regulated Six PFAS analytes in soil above the laboratory reporting limit (HW-X(m) [7-9]). Groundwater testing in the area did identify concentrations of the Sum of Six PFAS (HW-X[s] and HW-X[m]) above the applicable Method 1 GW-1 Standard, however the impacts are not consistent with the Airports AFFF release. The detections appear to be related to the off Airport PFAS source(s) that are migrating onto the Airport. Additionally, testing of surface water from Upper Gate Pond did not identify any of the Sum of Six PFAS analytes above the laboratory reporting limit.*

The facts detailed above have been confirmed with multiple rounds of soil and groundwater testing and the Conceptual Site Model supports the statement by the two fire fighters that AFFF was not used prior to 1991 for non-emergencies.

(2) *It is entirely possible that a rapid leaching rate would have resulted in prior slugs of PFAS slugs moving through the aquifer after each release event leaving residual concentrations as the source. The last major AFFF training event was in 2015 with a higher amount of AFFF than typically used. Targeted sampling of shallow groundwater beneath the Deployment area beginning in 2017-2018 found high concentrations of both telomer and legacy AFFF PFAS just two years later.*

It is more likely that the variable water table in this area is responsible for the increase and decrease in PFAS concentration as groundwater interacted with soil in the capillary fringe zone. Between 2017 and 2022, groundwater at HW-F (within the deployment Area) fluctuated 4.9 feet with an average depth of 19.6 feet.

Based on the Conceptual Site Model and details included in multiple reports submitted to the MassDEP, AFFF was first used in the Deployment Area in 1994 and reached groundwater in approximately 2014. Annually, approximately 43 inches of rain is received in the Hyannis area. Using the retardation rate formula included in the Phase II Report and a TOC of 1,350 ppm (median TOC value from the samples collected in the Deployment Area), it is assumed that PFAS moved through the soil column in the Deployment Area at a rate of approximately 10.5 inches per year. This rate correlates with the analytical data collected and the fate and transport model developed for the Airport.

Additionally, as documented in the research article titled "A Mathematical Model for the Release, Transport, and Retention of PFAS in the Vadose Zone" and published in the Water Resources Research Volume 56, Issue 2 and dated February 2020, it can take decades for PFAS to move as little as 15 feet in a sandy soil column. The article relates this partially to the lower water content caused by greater gravity drainage and weaker capillary retention in the sand. This results in higher retardation rates than other soils and PFAS tend to accumulate at air-water interfaces and may stay in the vadose zone for long periods before contaminating groundwater. It is important to distinguish between the Airport's infrequent use of AFFF for training exercises in relation to the BFTA. Groundwater contamination at the BFTA was likely accelerated through PFAS being directly discharged to Flint Rock Pond, shallower depth to groundwater, and more soil saturation events due to continuous fire training exercises with high water usage.

(3) *The Airport's signature compound 6:2 FTS was identified in the Maher #1 well directly downgradient of the Air Rescue Fire Facility (ARFF) prior to it recently showing up in the Maher #2 well from the Deployment Area.*

The detection of 6:2 FTS does not automatically indicate that the Airport is the source. Forensic signatures need to be reviewed by qualified individuals and must also consider dilution, plume comingling, groundwater flow, and PFAS analyte ratios.

6:2 FTS is present in the BFTA plume in multiple locations and concentrations and is also associated with other non-AFFF sources. It has also been detected at several cross-gradient and upgradient locations. As indicated on the radar plots provided above, the PFAS signature detected in Maher Well 1 (6:2 FTS = 10%) and Mill Creek (6:2 FTS = 11%) is more consistent with the BFTA (13%) than the Airport (79%). Again, multiple lines of evidence were included in the investigation to conclude that the Airport's PFAS plume impacted the Maher Wells (ME-2 only) in 2022.

(4) *The Airport indicates that PFAS contamination from the ARFF where equipment was used for years (where AFFF equipment is prepped, cleaned, rinsed, and stored) is the result of a single event in 1996.*

The statement above is incorrect. As indicated in the Phase II and Phase IV Reports:

"The current Airport Rescue and Firefighting/Snow Removal Equipment (ARFF/SRE) Building was constructed in 1996, and PFAS is assumed to have been released in this area through what is presumed to be incidental spillage, drips from fire hoses that are hung to dry, and cleaning of equipment in the event of accidentally engaging the foam pump button. Interior floor drains within the ARFF/SRE building historically discharged to the adjacent grass area that was capped in the fall of 2020 to reduce infiltration of stormwater. The interior floor drains were closed in the 2000's and connected to a permitted discharge to the Barnstable Wastewater Treatment Plant".

The exact date of the release(s) from this area are unknown.

(5) *The Phase 3 and 4 reports do not provide a plausible explanation that the PFAS in the Maher #1 Well was not from the AFFF use at the ARFF. Modeling results by the Airport contain areas for further clarification as commented on the attached.*

As indicated above, the detection of 6:2 FTS does not automatically indicate the Airport is the source. Impacts at Maher Well 1 are consistent with the BFTA signature (i.e., PC-18) and near Wendy's (HW-U[d]). Additional details regarding this are presented in the response to questions below.

(6) *The former ARFF, used until 1996, was also located upgradient of the Maher Wells on the west end of the terminal prior to recorded procurements of AFFF beginning in 2000.*

As indicated above, this area was investigated and determined to not be a source of PFAS consistent with the Airport's release.

(7) PFAS studies at the Martha's Vineyard Airport identified both legacy PFOS and Telomer PFAS compounds in plumes over 2 miles in length. The Gateway airport is similar in many instances, including its use of AFFF, level of flight activity, hydrogeology, and has a

concurrent period of operation to the MV Airport. How is it that PFAS leached into groundwater so much faster in Martha's Vineyard resulting in broad downgradient areas of contamination while the Cape Cod Airport did not? The difference is a major pumping supply well downgradient of the Cape Cod Airport that made the evidence disappear. But it did not really disappear. It was transported away through the water system.

Every Disposal Site and Conceptual Site Model is different and is based on Site specific details that are thoroughly evaluated by a Licensed Site Professional (LSP). The Airport has not been following the PFAS investigation at the Martha's Vineyard Airport because it is not relevant to it's investigation. However, based on a cursory review of the Phase II Comprehensive Site Assessment prepared by Tetra Tech and dated November 18, 2022, the Airport offers the following substantial differences that may account for the large length of the groundwater plume and why it occurred quicker than the Cape Cod Gateway Airport:

- The Martha's Vineyard Airport reported using 100 to 400 gallons of AFFF concentrate during its bi-annual testing, which creates approximately 3,300 to 13,200 gallons of AFFF. The Cape Cod Gateway Airport used 80 gallons of AFFF annually, which created approximately 2,670 gallons of AFFF. This indicates the volume of AFFF discharged at the Martha's Vineyard Airport is anywhere from 2 to 10 times more AFFF usage than the Cape Cod Gateway Airport during apparatus testing.
- AFFF was used on the paved asphalt aprons which discharge to catch basins and ultimately to either underground infiltration galleries or a stormwater outfall. Sheet flow from the paved areas would direct substantial quantities of water concentrated into these small areas with potentially significant PFAS contamination. This scenario would mobilize the contaminants through the soil column at a significantly higher rate than would be expected from a surface release migrating through the subsurface only through contact with precipitation.
- As previously indicated, the Cape Cod Gateway Airports PFAS plume impacted the Maher Well area in 2022 after PFAS treatment was installed. The drinking water provided by Maher Wells meets the MassDEP drinking water criteria. It is much more likely that the impacts detected at Maher Wells prior to 2022 are from other non-airport sources such as the BFTA.

(8) *6:2 FTS has been identified in Mill Creek by Harvard researchers in 2018 and more recently in 2023 sampling by DEP for the Town of Yarmouth. The Airport did not provide an investigation of PFAS in Mill Creek. The Maher wells were basically shut down from 2016 to 2020 due to PFAS contamination which would allowed contaminated groundwater to continue to flow to the creek.*

As indicated above, the PFAS detected in Mill Creek is not consistent with the Airports PFAS release. Additionally, the Airport's PFAS plume has never exceeded GW-3 and has been modeled

to be below the GW-1 standard (based on the Airport's PFAS contribution only). As such, investigation into the PFAS detected in Mill Creek above regulatory standards in the responsibility of others. The Airport has not been provided with the data collected by MassDEP. This has been brought to the attention of MassDEP and others by the Airport. If a Responsible Party can be identified by the MassDEP, they will issue a Notice of Responsibility requiring the Responsible Party to initiate investigation and cleanup activities. The Airport is not responsible for PFAS plumes relating to non-Airport sources. It is now in the hands of MassDEP to identify other sources and/or determine next steps.

(9) The initial proposed remedial monitoring program and the recent IRA status report did not include regular testing and reporting of the Maher wells to the Bureau of Waste Site Clean-up as required in the MCP in order to prove both capture and treatment of PFAS to the impacted public. PFAS testing at the Maher Wells should include a broad suite of compounds including the Airport' signature 6:2 FTS and other compounds and present them in the body of the report. The submittal of regular monitoring reports should be notified to the PIP.

The Airport competed sampling of Maher Wells on 9/17/2020, 7/29/2022, 11/2/2022, 2/2/2023, 5/26/2023, and 12/6/2023. As indicated in the DRAFT Phase IV Completion Report:

"The groundwater treatment system is managed by the Town of Barnstable/Hyannis Water System consistent with MassDEP requirements. As part of the Plant's compliance testing, samples of the treated groundwater are collected quarterly and submitted to a laboratory for analysis of multiple contaminants including PFAS. The Plant also collects process control samples monthly from multiple locations throughout the Plant process including the untreated groundwater, before filtration, after the lead GAC vessel, after the lag GAC vessel and at the treated tap. This information is used to adjust the treatment process as necessary and to determine when GAC replacement is needed. In addition, the Plant has an emergency generator in the event of a power failure".

The testing detailed in the paragraph above is completed by the Town of Barnstable/Hyannis Water System and not by the Airport.

Groundwater monitoring by the Airport will be conducted bi-annually to monitor the effect of the soil caps on the Airports PFAS Plume. At a minimum, groundwater samples will be collected from the following wells for PFAS analysis:

- HW-I(s)
- HW-I(m)
- H-I(d)
- HW-S (s)

- HW-S (m)
- HW-P(s)
- HW-P(m)
- HW-302
- HW-3
- ME-1 (untreated intake water from Maher Drinking Water Well 1)
- ME-2 (untreated intake water from Maher Drinking Water Well 2)
- ME-3 (untreated intake water from Maher Drinking Water Well 3)

Groundwater sampling will occur in May and November. Consistent with PIP requirements, Public comments on monitoring reports is not required. The public can review all reports on-line through either the MassDEP or the Airport's website. Additionally, drinking water quality reports for Hyannis can be obtained from the Town of Barnstable.

(10) It was stated that the preparation, cleaning and rinsing of the AFFF equipment was done only at the Deployment Area rather than at the ARFF Station where 800 gallons of AFFF are routinely stored. The designated area for cleaning equipment as discussed in the Phase II was the ARFF. PFAS6 found in soils and groundwater beneath and downgradient of the ARFF including both legacy and telomer types of AFFF argue that preparation and maintenance of AFFF equipment was at the Fire Station built for that purpose.

The use of AFFF and the subsequent rinsing of apparatus after usage did take place in the Deployment Area. A fire hydrant is located in this area that would allow staff to purge the system of AFFF after usage. It is believed the statement that is being referred to in the Phase II Report is the following:

"The current Airport Rescue and Firefighting/Snow Removal Equipment (ARFF/SRE) Building was constructed in 1996, and PFAS is assumed to have been released in this area through what is presumed to be incidental spillage, drips from fire hoses that are hung to dry, and cleaning of equipment in the event of accidentally engaging the foam pump button. Interior floor drains within the ARFF/SRE building historically discharged to the adjacent grass area that was capped in the fall of 2020 to reduce infiltration of stormwater. The interior floor drains were closed in the 2000's and connected to a permitted discharge to the Barnstable Wastewater Treatment Plant".

The statement above that was included in the Phase II Report is speculation on how the ARFF/SRE Building area may have been impacted with PFAS since no documented release of AFFF in this area was documented. As indicated above, a fire hydrant is in the Deployment Area that was historically used to wash out equipment after AFFF usage.

(11) The second is the insertion that PFAS from the Barnstable County Fire Training Academy (BCFTA), which contaminated the Mary Dunn wells (estimated by HW as occurring) in

1970), was subsequently collected in the sewered areas served by the water supply and discharged by the Hyannis wastewater plant (WPCF) to travel in groundwater over 32 years to the Maher Wells.

When multiple PFAS plumes were identified in the vicinity of the Airport, multiple potential scenarios were evaluated as part of the Conceptual Site Model. The Airport is not required to identify the upgradient source(s) responsible for contamination or to investigate or delineate the extent of these impacts. The Conceptual Site Model has evaluated the BFTA as a potential significant source of PFAS in the area. Considering that Mary Dunn Wells are located within approximately 1,800 feet downgradient of the BFTA, it is entirely possible that PFAS could have impacted the Marry Dunn wells in the late 1970s if AFFF was applied to Flint Rock Pond anytime between the mid 1960's and early 1970s. Travel time from Flint Rock Pond to these wells is less than seven years. For comparison purposes, the highest detected PFAS Sum of 6 in soil at the Airport is almost five times lower than the sediment detections in Flint Rock Pond.

Details included in the report titled *Immediate Response Action Status & Remedial Monitoring Report No. 64 & Interim Phase II CSA Status Report*, prepared by BETA and dated April 2023 document PFAS Sum of 6 in Flint Rock Pond in 2022 as 493.9 ng/l (surface water) and 1,000 ug/kg (sediment) in Mary Dunn Pond at 53 ng/l, and in ground water as high as 303,000 ng/l (PFOS only). These high concentrations and consistent detection of the BFTAs signature in the area supports this statement.

(12) *The ARFF HW-3 monitoring well identified as a downgradient ARFF plume should have been included in the forensic analysis.*

As indicated above, the Airport utilized its entire groundwater data set and included groundwater analytical data collected by others (i.e., BFTA) in the forensic analysis. Additional details are included in the response below, and radar plots and cross-sections for HW-3 are included in the Phase II Report.

(13) *The contamination of a broad area of the Hyannis aquifer with 1-4 Dioxane is similar to PFAS. While both legacy and telomer AFFF was used extensively at the BCFTA, 1-4 dioxane was not. 1-4 Dioxane is a major component of airplane deicing fluid. Like MTBE, Perchlorate, TCE and Benzene, 1-4 Dioxane moves readily, often leaving no trace at its source. Thus, its absence in source area samples is not de facto proof that it was never used, always contained, and never released. Its presence in downgradient wells and associated resources indicates it was released into the environment. The drainage connection of the deicing pads to the WPCF sewer is also a reasonable area for investigation.*

A substantial number of details on why the Airport is not the source of 1,4 dioxane was presented in the Phase II Report. The source of the 1,4-dioxane was identified hydraulically upgradient to

the Airport in the vicinity of Cape Cod Gun Works (HW-V[m]). Refer to Cross Section 2 in the Phase II Report on page 120 for a graphical depiction of the 1,4-dioxane plume that is impacting the Airport from an unknown off-site source. Additionally, SDS sheets for the deicing fluid utilized at the Airport indicated 1,4-dioxane at a concentration of less than 5 parts per billion. Considering this very low concentration, 1,4-dioxane is not a "major component of airport deicing fluid".

(14) *The actual area of impact of the WPCF was not addressed. Groundwater modeling at its average discharge rate of 1.7 MGD indicates that effluent entrained in groundwater from the WPCF does not migrate to the Maher Wells. A number of modeling studies, including the USGS who delineated the MEP coastal watersheds, that are the basis of the $1.2 Billion-dollar CWMP, do not include nitrogen from the WPCF in the Mill Creek (Maher Well) watershed. Meaning there is no present connection between the WPFC effluent plume and the Maher Wells.*

Particle tracking included in the report titled "The Distribution and Composition of PFAS in Select Water Supply Wells and Surface Waters of Barnstable" dated September 20, 2021 and prepared by Sole Source Consulting includes particle tracking from the wastewater plant as indicated below.

Based on the particle tracks shown above, it would be reasonable to conclude that PFAS discharged at the Wastewater Plant would mix with groundwater as it travels towards the Airport and continues towards Maher Wells. Nitrogen does not act the same as PFAS and it is not unreasonable to conclude that the Wastewater Plant is a potential source of PFAS detected at Maher Wells. The significant investigation completed by the Airport has identified non-Airport related PFAS plumes cross-gradient and upgradient that may or may not be related to the Wastewater Plant. Additionally, it would be the responsibility of others to determine if the PFAS from the BFTA was recirculated by the Wastewater Plant or if the impacts are from other non-AFFF sources.

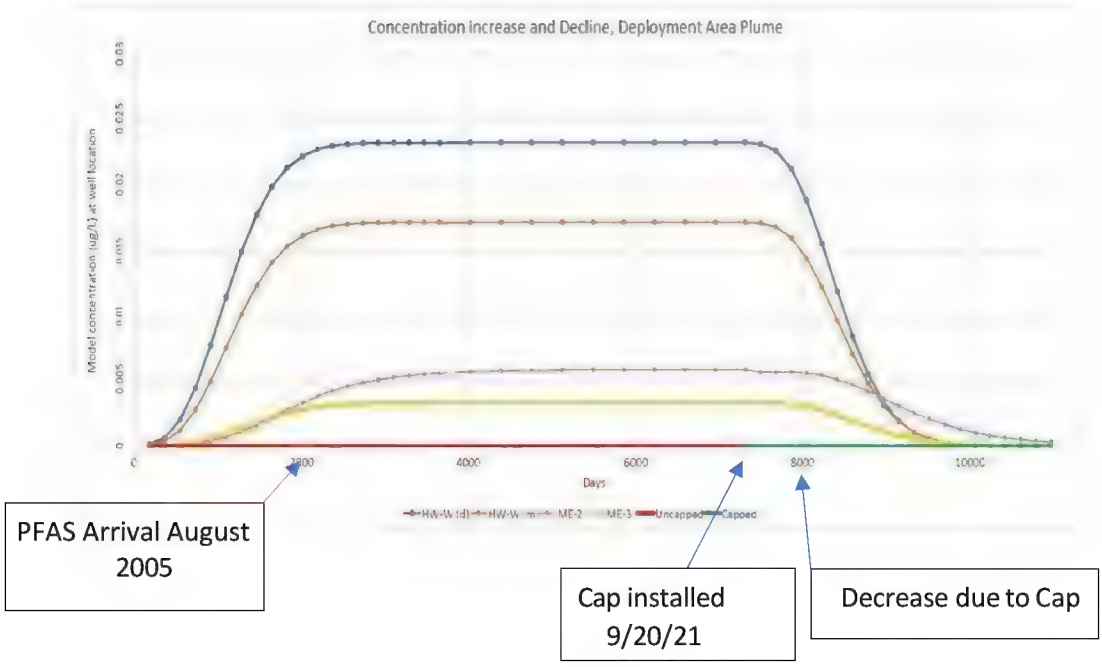
Below are comments provided by Mr. Cambareri on the PFAS Modeling in the Phase II Report.

(1) *The Airport's model graph for the Deployment Area PFAS6 plume indicates that it arrives at the monitoring well HW-W in August 2005. The well is ~1875 feet downgradient from the deployment area. Back calculating to the entrainment of PFAS6 in groundwater beneath the Deployment Area, using the report's estimated migration rate of 1.09, PFAS6 would*

have been entrained in groundwater in the year 2000. That is significantly earlier than the Airport's start of start of the recent Deployment Plume in 2015.

Alternatively, the modeling figure indicates that the decrease of PFAS6 As a result of the effect of capping in 2020 is observed at HW-W after 700 days. HW-W is approximately 1875 feet downgradient of the Deployment area. The results show that the effect of the cap is seen 1875 ft downgradient in 700 days indicating a groundwater travel of over 2.6 feet per day. A very fast migration time supporting fast migration of PFAS slugs.

Airport-model output of PFAS travel from the Deployment area source to selected monitoring wells. Monitoring Well HW-W is 1,875 feet downgradient from the Deployment Area. Calculations use the time in days and date of capping as a reference.



The graph included in the Phase IV Report is being misinterpreted. The graph depicts a transient model that simulates 20 years of recharge (red line on x-axis) with a PFAS Sum of 6 concentration of 1.172 ug/l (direct concentration applied to the aquifer) followed by 10 years of recharge (green line on x-axis) without any PFAS entering the aquifer. As a conservative approach, a 1.5 multiplier was also applied to the model output to overestimate the scenario. For additional context, the 1.172 ug/l was the highest Sum of 6 PFAS detected at the Airport when the model was created.

The model introduces the Sum of 6 PFAS contaminant directly into the groundwater over an area of 9,000 square feet (Deployment Area). The contaminant is then allowed to continuously leach for 20 years (an extreme overestimate and not representative of what occurred) at the 1.172 ug/l

concentration. The model reached equilibrium after approximately 7.5 years. The model is used to predict resulting plume responses and does not represent when contaminates entered the groundwater.

The scenario presented above shows that after approximately 7.5 years (~2,750 days), the concentration of PFAS reaches equilibrium and the model becomes a steady state. This is also the approximate amount of time it would take for the plume to reach Maher Well 2 once it enters groundwater and is traveling approximately 285 feet per year. Once a steady state has been reached, the model continues to run for 12.5 years (this is where the red line meets the green on the plot above). Next, the model stops adding PFAS and the model continues for another 10 years. The model predicts that after the cap is installed and flushing in the capillary fringe is complete, PFAS would drop to zero within approximately seven to ten years. Again, the model was used as a worst-case prediction tool and does not represent when contaminates entered the groundwater.

(2) *The Airport's model for the ARFF used double the highest PFAS6 plume concentration of 362 ng/l that was sampled from the monitoring well HW-3, some 875 downgradient of the ARFF as the source. The ARFF source well HW-P had residual PFAS6 concentrations ranging from 248 ng/l* **(this number is incorrect and should be 65.9 ng/l)** *to 30 ng/l* **(this number is incorrect and should be 7.56 ng/l)**. *The modeled plume graph does not include the HW-3 well A much higher source concentration should have been used at the source to duplicate the high concentration of 362 ng/l found at the downgradient well HW-3. Because the ARFF plume had migrated to HW-3 with PFAS6 at 362 ng/l and 6:2 FTS at 470 ng/l, it likely would have been drawn into the Maher Wells just 700 feet further. Samples from the Maher Well #1, closest to the ARFF, had 253 ng/l PFAS6 and 70 ng/l 6:2 FTS.*

The use of twice the Sum of 6 PFAS concentration for HW-3 is an extremely conservative value. For example, the ratio of the PFAS Sum of 6 to 6:2 FTS for the Deployment Area plume before the cap at its highest concentration was approximately 9 percent (6:2 FTS = 13 ug/l and PFAS 6 = 1.172 ug/l). The ratio used for the ARFF/SRE Area was 154 percent. Also, as indicated in the Phase IV Report, the source of this plume was likely a single event, or several small finite events and this area is also impacted with Sum of 6 PFAS over the applicable standards from non-Airport related sources. Additionally, the Sum of 6 PFAS plume depicted does not extend to HW-3 because the concentration is less than half the GW-1 standard by the time it travels to that location. HW-3 has been included within the Disposal Site boundary based on forensics and the detection of 6:2 FTS consistent with the Airports PFAS plume. Refer to the cross-sections included in the Phase II Report.

2.0 BACKGROUND

The Airport is located in Hyannis, Massachusetts, and provides scheduled airline service, general aviation services, and other aviation related activities. The Airport is owned by the Town of

Barnstable and is managed through the Barnstable Municipal Airport Commission (BMAC). The Airport began as a private airport consisting of a single grass runway before being given to the Town of Barnstable in the 1930's. With the outbreak of World War II, the Airport was taken over by the federal government for wartime training and defense purposes. During the 1940's, the United States Navy used the Airport and expanded the airfield to include three runways. In 1946, the Airport was returned to a two-runway municipal airport (each runway has a designation at each end, being 15-33 and 6-24). In 1948, the Airport was conveyed by the United States government (pursuant to the Surplus Property Act of 1944) to the Town of Barnstable, acting by and through its Airport Commission.

Currently, the Airport is comprised of approximately 645 acres of land, with approximately 140 acres that are impervious (e.g., paved areas such as parking lots, runways, taxiways, aircraft parking aprons, concrete walkways, and building rooftops). The Airport's structures include the main terminal and the Air Traffic Control Tower (ATCT), which are located south of the runways and taxiways, as well as several hangars used for general aviation and operations services. In addition, the current Airport Rescue and Fire Fighting/Snow Removal Equipment (ARFF/SRE) Building is located in the southeast corner of the property. The Airport is situated in an area of Hyannis zoned for Business and Industrial uses.

2.1 Disposal Site Regulatory History

The evaluation to determine the nature and extent of PFAS impacts resulting from the Airports historic use of AFFF began in August 2016, when the Airport conducted an initial round of groundwater sampling at the request of MassDEP. Subsequently, a Notice of Responsibility (NOR), dated November 10, 2016, was issued to the Airport by MassDEP. The NOR requested that the Airport conduct additional field investigations to evaluate:

- The source(s) of PFAS including PFOS and PFOA detected in groundwater at the Airport;
- The source(s) of 1,4-dioxane detected in a monitoring well downgradient of the Airport on the Maher Well field property[1]; and
- To identify potential impacts to public water supply wells operated by the Hyannis Water District at the Mary Dunn and Maher Well fields.

1. *As indicated in the report titled "Final Phase IV Implementation of the Selected Remedial Action Alternative"* prepared by HW, dated January 2023, the Airport is not the source of 1,4-dioxane detected at the Maher Wells and as such the remedial and investigation efforts will focus only on PFAS.

A proposed IRA Plan was submitted to MassDEP for approval in response to the NOR. Subsequently, a meeting was held by MassDEP at the Airport that included other stakeholders including the Barnstable Department of Public Works, the Hyannis Water District, and Barnstable County representatives (representing the Fire Training Academy). At the meeting, IRA Plans were coordinated between the Airport and Fire Training Academy including sampling locations, type of

analysis, groundwater modeling, goals, and next steps. The IRA Plan served as the guide for the soil and groundwater testing conducted since November 2016 to follow up on the results of the previous analyses.

In June 2019, MassDEP issued a Request for Modified IRA Plan/Interim Deadline, dated June 18, 2019 to the Airport. The Modified IRA Request asked that the Airport propose response actions to *"reduce infiltration of precipitation through PFAS-impacted soil, such as temporarily capping the source areas; excavating and properly disposing of the PFAS-impacted soil; or some equivalent approach"*. The Airport's response is documented in the report titled *"Final Immediate Response Action Plan Modification"*, prepared by HW and dated December 2019 (IRA Modification). The IRA Modification included details for the installation of a cap in two select areas to reduce precipitation infiltration. The two areas are identified as the Deployment Area and ARFF/SRE Building Area as indicated on Figure 2. The two capped areas total approximately 94,100-square feet and represent a majority of the known PFAS source areas at the time of the report relating to the historic use of AFFF. The caps were completed in September 2020 and their construction is documented in the report titled *"Immediate Response Action Plan Status Report 8"*. The surficial extent of the two capped areas is indicated on Figure 3.

Refer to Figures 3 through 7 for PFAS sampling locations and to the Revised Phase II Report prepared by HW and dated January 2022 for additional details on the Disposal Site regulatory history and investigations relating to the nature and extent of PFAS relating to the Airports historic use of AFFF. Tabulated analytical results for all analysis collected as part of the investigation are included on Tables 2 through 9.

3.0 FINAL IRA MONITORING REPORT 14

Considering that the Airport has completed Phase IV activities, IRA activities are now considered complete and future monitoring of the Airports PFAS plume and cap areas (the Remedial Monitoring Program) will be documented in future Phase V Status Reports submitted every six months. Additional details on the monitoring program are included Section 9.0, and the Phase V Status Report for this period is included in Section 10.0.

3.1 IRA Field Investigation Activities Completed Between 2016 and 2023

A general description of field investigations conducted at the Airport since the November 2016 NOR and the final IRA samples collected in May and June 2023 are summarized below:

- Three soil samples were collected on December 9, 2016. One sample was taken from each location where it was determined that AFFF had been used at the Airport. The areas included the MCI Drill Area, the Deployment Area, and the 1991 Drill Location.
- One sample of AFFF concentrate was collected on December 9, 2016 and analyzed for PFAS

compounds. The analysis was inconclusive (only 225.5 ug/l of total PFAS was detected) and it is assumed that the sample was not homogeneous (i.e., had separated in the foam bucket) and that the addition of water to the concentrate may affect how precursor PFAS analytes transform into various other detectable PFAS compounds.

- The installation of groundwater monitoring wells at six locations in April 2017: in the vicinity of potential sources of PFAS at the ARFF/SRE Area, at the Deployment Area and at upgradient locations outside of the Airport to evaluate potential off-site sources of PFAS and 1,4-dioxane.
- Groundwater from the new wells was initially sampled for PFAS and 1,4-dioxane in April 2017. Additional groundwater samples and one surface water sample were collected for analysis of PFAS on June 20, 2017.
- A second round of soil samples were collected on June 20, 2017 adjacent to the ARFF/SRE Building and within the Deployment Area to begin to determine the extent of PFAS within the surface soils. Based on the results of these analyses, a third round of samples from these two locations were collected on September 26, 2017. The third round of sampling was designed to further delineate the extent of PFAS in soils both vertically and horizontally, with samples taken at the ground surface and at two and four feet below ground surface (bgs).
- Six soil samples were analyzed for PFAS leaching potential using a synthetic precipitation leaching procedure (SPLP) test between September and October 2017. The chosen samples included four samples from the Deployment Area and two samples from runway reconstruction soils stockpiled at the Airport.
- In October 2017, 20 surface samples were collected both on and off Airport property to determine the concentration of PFAS in the area (i.e., Background PFAS Concentrations).
- In October 2017, three composite soil samples were taken from piles of soil associated with the redevelopment of Runway 15/33. These piles were located on Airport property at the site of the former Mildred's Restaurant and were analyzed for PFAS compounds to evaluate if soil removed from the Airport as part of this redevelopment contained PFAS.
- On August 14, 2018, 24 PFAS surface soil samples were collected in proximity to the ARFF/SRE Building Area and the Deployment Area. PFAS compounds were previously detected in these areas and additional samples were collected to determine the vertical extent of PFAS impacts in soil and to refine the soil disposal site boundary at the Airport.
- In October 2018, three soil borings (DL11, DL14 and HW-F) were advanced in the Deployment Area. One soil boring (ARFF3) was advanced, and one surface soil sample (HW-3) was collected near the ARFF/SRE Building in order to further delineate the extent of PFAS in soils both horizontally and vertically.
- In October 2018, six monitoring wells were installed at the Airport. A cluster of three wells (HW-G(s), HW-G(m), and HW-G(d)) were installed at an upgradient location to evaluate

potential off-site sources of PFAS. Three additional wells (HW-H, HW-I, and HW-J) were installed southeast of the Deployment Area adjacent to the East Ramp.

- In November 2018, six groundwater samples were collected to evaluate PFAS concentrations in the Deployment Area. Four groundwater samples and one surface water sample from Mary Dunn Pond were also collected for analysis of oxygen and hydrogen isotopes to determine the contribution of pond water from Mary Dunn Pond to the four downgradient monitoring wells. The analysis was inconclusive in tracing the contribution of pond water in the downgradient monitoring wells.
- In December 2018, two soil samples were collected from the 1991 Drill Location to determine if PFAS detected in the area are related to background conditions.
- In December 2018, 12 groundwater samples were collected for analysis of PFAS, and 13 groundwater samples were collected for analysis of oxygen and hydrogen isotopes to determine the contribution of pond water from Mary Dunn Pond to the 13 downgradient wells. Groundwater samples were also collected from four monitoring wells in the Maher Wellfield for analysis of 1,4-dioxane.
- In February 2019, three additional surface soil samples were collected to further delineate the soil Disposal Site boundary around the ARFF/SRE building.
- In May and June 2019, HW installed nine groundwater monitoring wells to delineate the vertical and horizontal extent of PFAS and 1,4-dioxane at the Airport and on adjacent hydraulically upgradient properties.
- In June 2019, eight groundwater samples were collected from newly installed groundwater monitoring wells HW-L, HW-K, HW-I (m), HW-I (d), HW-M, HW-D(d), HW-D (dd), and HW-N for PFAS.
- In July 2019, one groundwater sample was collected from the newly installed groundwater monitoring well HW-O for PFAS. One groundwater sample was collected from HW-L for 1,4-dioxane.
- In July 2019, two surface water samples were collected from Upper Gate and Lewis Ponds for PFAS analysis.
- In August 2019, four groundwater samples were collected from monitoring wells HW-N, HW-A(d), HW-O, and HW-1 to evaluate potential sources of 1,4-dioxane entering the Airport from unknown upgradient sources(s). One groundwater sample was also collected from groundwater monitoring well HW-E for PFAS.
- In August 2019, soil sample DL 11 (0-1) was collected from the Deployment Area.
- In August 2019, six spray water samples were collected from discharge locations on a fire truck at the Airport. The samples were collected to verify that the valve mechanism that controls the mixing of AFFF with water was working appropriately. PFAS should not be detected in the spray water. Although the spray water is not considered drinking water,

PFAS was detected in each of the six samples collected above the GW-1 standard.

- On September 27, 2019, HW collected groundwater samples from six monitoring wells located on the Airport for 1,4-dioxane analysis.
- In November 2019, the Airport replaced the valve mechanism in the fire truck to ensure that AFFF was no longer mixing with the water despite the mechanism not being engaged. In December 2019, HW resampled the six discharge locations from the fire truck at the Airport. PFAS was detected at various concentrations at each location, but all were below the GW-1 standard.
- Between May 5th and May 21st, 2020, HW collected 16 groundwater samples PFAS analysis.
- Between May 5th and May 13th, 2020, HW collected groundwater samples from four monitoring wells for 1,4-dioxane analysis.
- Between August 17, 2020 and September 28, 2020, HW oversaw the installation of the asphalt cap in the ARFF/SRE Building Area and the geomembrane cap in the Deployment Area. Approximately 850 cubic yards of soil from the ARFF/SRE Building Area generated during cap construction was used for grading and shaping of the cap area in the Deployment Area. This soil was completely covered by the geomembrane. Refer to IRA Status Report 8 for additional details.
- Between September 14th and September 24th, 2020, HW and Desmond Well Drilling installed 13 monitoring wells.
- On September 17, 2020, HW collected groundwater samples from the three Maher Wells (ME-1 through ME-3) for PFAS analysis.
- Between September 14th and September 30th, 2020, HW collected 23 soil samples for PFAS analysis.
- Between October 1 and October 7, 2020, HW collected groundwater samples from 16 monitoring wells for PFAS.
- On October 2 and 7, 2020 HW collected groundwater samples from four monitoring wells for 1,4-dioxane analysis.
- Between November 5 and 6, 2020, HW collected five groundwater samples for PFAS analysis.
- On November 17, 2020, HW collected two roof samples (rubber membrane and asphalt shingle) from the ARFF/SRE building for SPLP PFAS. The testing was completed to determine if roofing materials were a potential source of PFAS in groundwater through stormwater infiltration. PFAS was detected in each of the samples collected. Although the leachate is not considered drinking water, the concentration of the MassDEP Sum of 6 was below the Method 1 GW-1 and GW-3 standards.
- On February 18 and 19th, 2021 HW conducted hydraulic conductivity testing at three

monitoring well locations. Refer to the Revised Phase II Report for additional details.

- Between March 17th and March 19, 2021, HW collected 21 groundwater samples for PFAS analysis as part of the first round of post-cap semiannual monitoring.
- Between April 5th and April 7th, 2021, HW and Desmond Well Drilling installed monitoring wells HW-U(s), HW-U(m), HW-W(m), HW-W(d), and HW-W (dd).
- Between April 6th and 19th, 2021, HW collected 17 soil samples for total organic carbon (TOC) analysis. The TOC samples were collected from various depths between the ground surface and 65 feet below grade. The TOC data was used to determine plume migration.
- On April 19, 2021, HW sampled the recently installed monitoring wells HW-U(s), HW- U(m) HW-W(m), HW-W(d), and HW-W (dd) for further analysis of PFAS compounds in groundwater.
- On September 7, 2021, HW and New England Geotech installed monitoring wells HW- X(s) and HW-X(m). The monitoring wells were installed adjacent to the former ARFF/SRE Building.
- On September 7, 2021, HW collected a soil sample from HW-X (m) and submitted it for PFAS analysis. None of the MassDEP six regulated PFAS compounds were detected above the laboratory method detection limit.
- On September 10, 2021, HW collected groundwater samples from HW-X (s) and HW- X(m) and submitted them for PFAS and 1,4-dioxane analysis.
- Between September 1 and September 11, 2021, HW collected 26 groundwater samples as part of the second round of post cap semiannual monitoring.
- On September 10, 2021, HW collected two groundwater samples from monitoring wells HW-E and HW-J located in the Deployment Area for 1,4-dioxane. 1,4-dioxane was not detected above the laboratory reporting limit.
- On March 2nd and 4th, 2022, HW collected six surficial composite soil samples from Runway 6-24 and submitted them to Alpha Analytical for PFAS analysis. Redevelopment of Runway 6-24 began in April 2023 and was completed in October 2023. The soil testing was conducted to evaluate how soil removed from the areas around the runway would need to be managed if they were taken off site. None of the MassDEP six regulated PFAS compounds were detected above the applicable Method 1 Standard.
- Between March 15th and March 31st, 2022, HW collected 29 groundwater samples for PFAS analysis.
- On May 18th, 2022, HW collected three groundwater samples for PFAS analysis.
- Between July 29 and August 8th, 2022, HW collected eight groundwater samples for PFAS analysis.

- Between October 31 and November 2, 2022, HW collected groundwater samples from the three Maher Wells (ME-1, ME-2 and ME-3) and monitoring wells HW-W(m), HW-I(s), HM-I(m), HW-I(d), HW-3, HW-P(s), and HW-P(m) for PFAS analysis.
- On February 2, 2023, HW collected groundwater samples from the three Maher Wells (ME-1, ME-2 and ME-3) and monitoring wells HW-I(s) and HW-P(s) for PFAS analysis.
- On March 16 and 17, 2023, HW and Desmond Well Drilling reinstalled monitoring wells HW-H and HW-R (Figure 4) that were destroyed by the Lawrence Lynch Corporation (road work construction company) during the Mary Dunn Way road paving/sewer line installation project. It is estimated that the wells were destroyed during the week of July 12, 2022. It should be noted that these wells are used to track the groundwater plume from the Deployment Area. The soils in the vicinity of Mary Dunn Way have not been impacted by the Airports historic use of AFFF. Refer to Figure 2, soil samples A7, A8, A9, A11, A12, D10, D11, DL19, DL20, and DL21.
- The Airport submitted groundwater samples from HW-I(s), HW-I(m), HW-I(d) and ME-1 through ME-3 (Maher Wells 1 through 3) for forensic PFAS analysis at Battelle. As indicated in previous reports, HW-I(s) is representative of the Airports PFAS Plume, and HW-I(m) and HW-I(d) are representative of upgradient non-airport related sources (i.e., the Barnstable Fire Training Academy and others). The forensic report prepared by Battelle concluded that sample ***"HW-I(d) seems most like the ME samples"***.
- The final quarterly sampling event of the Maher Wells (ME -1 through ME-3) occurred in May 2023.
- HW collected groundwater samples from nine monitoring wells for PFAS in June 2023, and from three monitoring wells in December 2023.
- HW will continue to sample select wells in the vicinity of the Deployment Area, ARFF/SRE Building and other select locations bi-annually as part of the on-going evaluation of the cap and PFAS plume monitoring during Phase V (see additional details below in Section 9).

Analytical results are included on Table 2 through 9, and laboratory reports not previously submitted to the MassDEP are included in Appendix B. PFAS in groundwater trend graphs for select wells in the vicinity of the caps are included in Appendix C.

4.0 IRA COMPLETION STATEMENT

Pursuant to 310 CMR 40.0427, an IRA shall be considered complete when the release, threat of release and/or site conditions which give rise to the need for that IRA, as described in 310 CMR 40.0412, have been assessed and, where necessary, remediated in a manner and to a degree that will ensure, at a minimum:

- The accomplishment of any necessary stabilization of site conditions.

As indicated above and in the Final Phase IV Report, the installation of the two caps have significantly decreased the concentration of total PFAS in the vicinity of the Deployment Area and ARFF/SRE Area as indicated on the time plots included in Appendix B. As such, the majority of the PFAS impacted soil at the Airport is currently capped and stabilized. Groundwater monitoring and cap inspections will continue bi-annually as part of Phase V to document that disposal site is stable.

- The elimination or control of any Imminent Hazards to health, safety, public welfare and the environment, without the continued operation and maintenance of Active Remedial Systems or Active Exposure Pathway Mitigation Measures or the incorporation of ongoing response actions to eliminate or control the Imminent Hazard into the Phase IV Remedy Implementation Plan for the disposal site.

Considering that no private drinking water wells have been identified hydraulically downgradient of the Airport, and that the Town of Barnstable is providing drinking water that meets the required state drinking water standards and guidelines for PFAS, an imminent hazard as defined by 310 CMR 40.0006 is currently being prevented. Additionally, the Airport is compensating the Town of Barnstable for its allocated portion of responsibility for groundwater treatment that is occurring at the Maher Wells. This payment ensures that the burden of treatment at the Maher Wells resulting from the PFAS impacts from the Airport (Maher Well 2 only) does not fall on the public.

- The completion of time-critical measures addressing the elimination, prevention or mitigation of Critical Exposure Pathway(s) as documented with an LSP Opinion concluding that:
    - The Critical Exposure Pathway(s) have been eliminated using passive measures;
    - A feasibility study, as specified at 310 CMR 40.0414(3) and (4), supports the conclusion that it is not feasible to eliminate, prevent, or mitigate the Critical Exposure Pathway(s);
    - A feasibility study, conducted as part of a Phase III evaluation of Comprehensive Remedial Alternatives as specified in 310 CMR 40.0860, supports the conclusion that it is not feasible to eliminate, prevent, or mitigate the Critical Exposure Pathway(s) as part of the Comprehensive Remedial Alternative; or
    - Mitigation of Critical Exposure Pathway(s) is continuing by incorporation of ongoing response actions to address the Critical Exposure Pathway(s) into the Phase IV Remedy Implementation Plan for the disposal site.

IRA activities have been completed including the installation of two caps to prevent the further leaching of PFAS into groundwater. The Maher Wells groundwater treatment system operated by the Town of Barnstable is providing treated drinking water to the community eliminating the risk associated with ingestion of drinking water containing PFAS above the MassDEP regulatory limits. It should be noted that based on environmental forensics and fate and transport mechanisms documented in the Updated Phase II Report and Final Phase IV Report, the Airports PFAS plume

impacted the Maher Wells (ME-2 only) after the Town of Barnstable installed a treatment system designed to treat for PFAS. As such, mitigation of the Critical Exposure Pathway is being managed as part of Phase V activities.

The IRA has been successful in delineating the nature and extent of PFAS impacts in soil and groundwater relating to the Airports historic use of AFFF. Additionally, the Airport has reduced the potential for PFAS to leach into the underlying groundwater from its two source areas (ARFF/SRE Building Area and Deployment Area) and has discontinued the application of AFFF with the exception of an emergency situation.

Pursuant to 310 CMR 40.0427(5), the LSP Opinion, certification of submittal, and indication that the IRA is complete and Phase V activities will be conducted as part of the Comprehensive Response Action are set forth on the Comprehensive Response Action Transmittal Forms (BWSC-105 and BWSC-108) being submitted to the MassDEP concurrently with report.

5.0 REMEDIAL WASTE FROM THE IRA AND PHASE IV

Soil

As set forth in Final Phase IV Report, soil caps were previously installed at the Site and details regarding soil management relating to the cap construction were included in the *Immediate Response Action Plan Status Report 8*. Any future soil excavation within the areas indicated on Figure 5 as "Area of PFAS Impacts in Soil" will be documented in a Release Abatement Measure (RAM) Plan submitted to the MassDEP consistent with the MCP. There is currently no remedial waste stored at the Airport.

Groundwater

As part of the groundwater treatment process at the Maher Wells Drinking Water Plant (the Plant), granulated activated carbon (GAC) will require periodic replacement and disposal. The replacement and disposal of the GAC will be completed by the Town of Barnstable/Hyannis Water System staff consistent with its operating requirements and MassDEP registration (Appendix D). HW will not be involved in the operation, management or disposal of materials associated with the Plant considering it is adequately regulated under the MassDEP.

6.0 PHASE IV REMEDY IMPLEMENTATION

Site specific engineering concepts and design criteria used for the design and construction of the PFAS caps and treatment technologies utilized by the Plant were documented within the Final Phase IV Report which was submitted to MassDEP by HW in January 2023. The goals of remedial action, including performance requirements of the remedial systems, the requirements for achieving a

Permanent or Temporary Solution (whichever is applicable) under 310 CMR 40.1000 and the projected timeframe, based on available information, for achieving such Permanent or Temporary Solution was included in the Final Phase IV Report.

Based upon the evaluation of remediation technologies provided in Phase III, the selected remedy consisted of treatment of groundwater at the Maher Wells and implementation of soil caps. Groundwater monitoring and cap inspections will continue to be conducted bi-annually and documented in future Phase V Status Reports until a Permanent or Temporary Solution can be achieved.

6.1 Goals of the Remedy

Soil Caps

The goal of the soil caps is to reduce the infiltration of PFAS from soil into groundwater. The caps were installed in 2020 at the locations indicated on Figure 3. The caps have significantly reduced the concentrations of total PFAS in groundwater in the vicinity of the Deployment Area and ARFF/SRE Area, as indicated on Table 3 and the time plots presented in Appendix C.

Fluctuations in the concentration of PFAS is expected as the groundwater level rises and falls over the next several years and contaminants are flushed from the capillary fringe zone. After flushing is complete, concentrations associated with the Airports PFAS Plume are expected to decline. The effectiveness of the caps will be documented through the collection of groundwater samples until a Permanent or Temporary Solution can be achieved. The caps will be inspected twice annually and maintained as necessary until a Permanent or Temporary Solution can be achieved. Assuming that the future Permanent or Temporary Solution relies on the caps to maintain a level of no significant risk, the caps will be maintained and inspected in the future in accordance with an Activity and Use Limitation (AUL). Any future construction within the estimated extent of PFAS impacted soils indicated on Figure 5 will be conducted under a RAM.

Groundwater Treatment

The goal of the groundwater remedial action is to reduce the concentration of PFAS in groundwater and to provide safe drinking water to the Town of Barnstable. The Town of Barnstable began construction of the Plant in 2019. The Plant was designed by Tata and Howard, Inc. for the treatment of PFAS, 1,4-dioxane, iron, and manganese. The Plant utilizes green sand filtration, advanced oxidation, and GAC.

The plant has a design capacity of 1,500 gallons per minute and removes PFAS with granular GAC filtration; 1,4-Dioxane by advanced oxidation with peroxide and ultraviolet light (UV); and iron and manganese by greensand filtration. The plant was completed in 2020 with the design reviewed and approved by MassDEP. The plant has been providing the Town of Barnstable with drinking water

that meets state and federal drinking water requirements as documented in the Annual Water Quality Report from 2022 (Appendix E).

Based on contaminant migration fate and transport mechanisms incorporated into a USGS MODFLOW Model (included in the Final Phase IV dated January 2023) it is expected that groundwater impacts from the Airports PFAS plume in all impacted areas will be less than the

GW-1 standard by 2031. The model also suggests that PFAS impacts at the Maher Wells would not exceed the current GW-1 standard (0.02 ug/l) if the Airports PFAS plume was the only source of PFAS impacting them.

It should be noted that the Maher treatment plant became operational in October 2020. The Airport PFAS plume was not detected in Maher Wells prior to the Plant becoming operational. The Airports PFAS plume was detected in Maher Well 2 in July 2022. The Airports PFAS signature has not been detected in the other two Maher Wells (ME-1 and ME-3) which is consistent with MODFLOW modeling previously documented in the Final Phase IV.

Cap inspection and groundwater monitoring has been reported in IRA status reports. Future reports of the remedial action will be documented in Phase V Status Reports submitted bi- annually. The first Phase V Status Report is included in Section 10.0.

7.0 PHASE IV FINAL INSPECTION REPORT

Pursuant to 310 CMR 40.0878, a final inspection must be conducted by the Licensed Site Professional (LSP) of record to ensure that:

- The Comprehensive Remedial Action has been constructed in accordance with construction plans under 310 CMR 40.0874(3)(c) of the Phase IV Remedial Implementation Plan or appropriate modification to such plans; and

- Following initial implementation and operation and any modifications or adjustments necessary to optimize the performance of remedial systems, the Comprehensive Remedial Action is meeting projected design standards.

The Comprehensive Remedial Action activities were substantially completed in a manner consistent with the specifications set forth in the Final Phase IV Report dated January 2023 and the Comprehensive Response Actions are meeting projected design standards.

8.0 PHASE IV COMPLATION STATEMENT

Pursuant to 310 CMR 40.0879(2), the LSP Opinion, certification of submittal, and indication that the Phase IV is complete and that Phase V activities will be conducted as part of the Comprehensive Response Action is set forth on the Comprehensive Response Action Transmittal Form (BWSC-108) being submitted to the MassDEP concurrently with this report.

9.0 PHASE V OPERATION, MAINTENANCE, AND MONITORING

Pursuant to 310 CMR 40.0891(1), the provisions of Phase V shall apply to disposal sites where Phase IV response actions have been completed and operation, maintenance and/or monitoring (OMM) of the Comprehensive Remedial Action is necessary to achieve a Permanent or Temporary Solution under 310 CMR 40.1000.

Phase IV response actions have been completed at the Site and monitoring of the Comprehensive Response Action is required to achieve a Permanent or Temporary Solution. An OMM plan outlining additional monitoring activities to achieve a Permanent or Temporary Solution is set forth below.

9.1 Operation, Maintenance, and Monitoring Plan

Soil Caps

The two soil cap areas at the Airport (Figure 3) will be inspected bi-annually. The first Phase V inspection is included in Section 10.2 The cap inspections will include the following:

- Asphalt Cap: The asphalt cap will be inspected by the LSP of Record to document that it is free of any cracks or significant depressions. Crack sealing, if needed, is routinely completed as part of the Airports general asphalt management program. The cap area will also be monitored for any significant depressions. Significant depressions that result or could result in damage to the asphalt cap will be noted and fixed, as necessary. Photographic documentation of the asphalt cap area will be included in Phase V Status Reports.
- Geomembrane: The geomembrane cap will be inspected by the LSP of Record to document that the protective soil cover is free of any depressions or erosion. Significant depressions or erosion that could result in damage to the geomembrane cap will be noted and fixed, as necessary. Photographic documentation of the geomembrane cap area will be included in Phase V Status Reports.

Groundwater Treatment

The groundwater treatment system is managed by the Town of Barnstable/Hyannis Water System consistent with MassDEP requirements. As part of the Plant's compliance testing, samples of the treated groundwater are collected quarterly and submitted to a laboratory for analysis of multiple contaminants including PFAS. The Plant also collects process control samples monthly from multiple locations throughout the plant process including the untreated groundwater, before filtration, after the lead GAC vessel, after the lag GAC vessel and at the treated tap. This information is used to adjust the treatment process as necessary and to

determine when GAC replacement is needed. In addition, the Plant has an emergency generator in the event of a power failure. A copy of the 2024 Registration and 2022 water quality report are included in Appendix D and E, respectively.

Groundwater Monitoring

Groundwater monitoring will be conducted bi-annually to monitor the effect of the soil caps on the Airports PFAS Plume. At a minimum, groundwater samples will be collected from the following wells for PFAS analysis:

- HW-I(s)
- HW-I(m)
- H-I(d)
- HW-S (s)
- HW-S (m)
- HW-P(s)
- HW-P(m)
- HW-302
- HW-3
- ME-1 (untreated intake water from Maher Drinking Water Well 1)
- ME-2 (untreated intake water from Maher Drinking Water Well 2)
- ME-3 (untreated intake water from Maher Drinking Water Well 3)

Groundwater sampling will occur in May and November. The next groundwater sampling event will occur in May 2024. Additional wells beyond those described above may be sampled and/or installed at the discretion of the LSP and documented in future monitoring reports.

9.2 Inspection and Monitoring Reports

Groundwater monitoring and bi-annual cap inspections will be completed to document the cap effectiveness and track the plume migration as part of Phase V until a Permanent or Temporary Solution can be achieved. The Plant will continue to be operated by the Town of Barnstable/Hyannis Water System consistent with its MassDEP permit requirements.

Pursuant to 310 CMR 40.0892, Phase V Status Reports will be submitted to MassDEP every six months.

10.0 PHASE V STATUS REPORT

10.1 Groundwater Monitoring

Details concerning field investigations conducted between October 2023 and April 2024 are summarized below.

- On December 5 and December 6, 2023, HW collected groundwater samples from the three Maher Wells (ME-1, ME-2 and ME-3) and monitoring wells HW-I(s), HW-I(m), H-I(d), HW-S (s), HW-S (m), HW-P(s), HW-P(m), HW-302, HW-3 for PFAS analysis.

Analytical results are included on Table 2, and laboratory reports are included in Appendix A. PFAS in groundwater trend graphs for select wells in the vicinity of the caps are included in Appendix C.

HW will continue to sample select wells in the vicinity of the Deployment Area, ARFF/SRE Building and other select locations bi-annually as part of the on-going evaluation of the cap and PFAS plume monitoring.

10.2 Bi-Annual Cap Inspection and Cap Performance Monitoring

HW has inspected the two caps bi-annually since the installation was completed. The first Cap inspection was conducted in March 2021. The most recent cap monitoring event was conducted on March 19, 2024. The asphalt cap was free of significant cracks. A slight depression was noted in the central portion of the ARFF/SRE Cap, where mobile refueler trucks are staged (right photograph). This area will be monitored to determine if corrective actions are necessary.

HW inspected the geomembrane cap on March 19, 2024, in the vicinity of the Deployment Area. The sand and loam protective layer over the geomembrane cap were intact with no signs of significant erosion as indicated in the photos below.

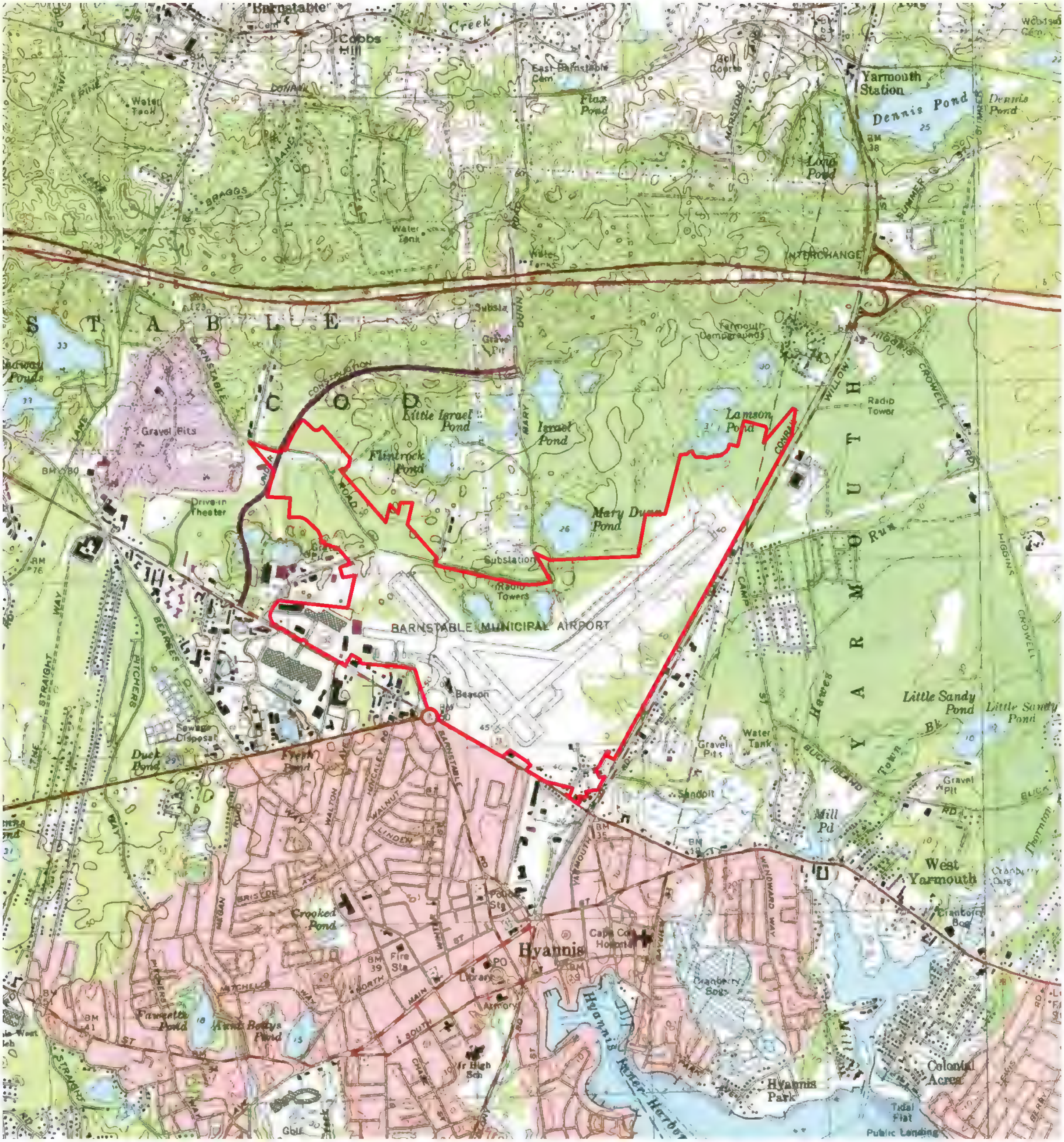
HW will continue to inspect the two cap areas every six months and collect groundwater samples from select existing monitoring wells to document the effectiveness of the caps. These details will be included in future Phase V Status Reports submitted every six months. The next Phase V Status Report will be submitted in October 2024.

11.0 PUBLIC INVOLVEMENT

Considering this is the last phased report until a Permanent or Temporary Solution is submitted, a IRA Status Report 14, DRAFT IRA Completion Statement, and DRAFT Phase IV Completion Report was submitted to MassDEP and notifications were distributed to all persons identified on Table 1, Community Notification List October 11, 2023. The Airport sent a subsequent notification on November 13, 2023 to all persons identified on Table 1, Community Notification List, about an in person meeting on December 18, 2023. After the meeting, the Airport provided an additional 45-day review period for the public and MassDEP to review the PFAS related investigation completed by the Airport. A Phase V Status report has also been included in this Report due to the extended comment period and the required regulatory submittals needed to satisfy the requirements of the Massachusetts Contingency Plan. Questions and Comments received by the public (the Siera Club, Hyannis Park Civic Association and Mr. Thomas Cambareri) are detailed above. Copies of the submitted questions/comments are included in Appendix A.

Pursuant to 310 CMR 40.0880, notification of the Final IRA Status Report 14, IRA Completion Statement, Final Phase IV Completion Report, and Phase V Status Report will be provided to all individuals on Table 1. This includes the Chief Municipal Officer and the Board of Health for both Barnstable and Yarmouth.

FIGURES



Document Path: H:\Projects\HYA\11072 (697 Barnstable Airport)\GIS_Maps\Maps\USGS_Locus_20130815.mxd

*Hyannis Topographic Quadrangle

Legend

Airport Property Line

N

0.5 Miles

Horsley Witten Group
Sustainable Environmental Solutions

USGS Locus
Cape Cod Gateway Airport
Hyannis, MA

Date: 4/17/2018

Figure 1

Flint Rock Pond
Barnstable Fire Training Academy
GP-5
MD-3
Off-Site BFTA PFAS Plume Impacting Airport and Others
Runway 15/33
MD-2
Mary Dunn Pond
Runway 6/24
Off-Site PFAS Plume Impacting Airport and Others
MD-1
1991 Drill Location
1981 Crash Site
Historic Deicing area
Air-1
Upper Gate Pond
Lewis Pond
Yarmouth Road
Deployment Area/ Deployment Area Cap
ARFF/SRE Building Area Cap
ARFF/SRE Building Area
2016 Crash Site
Historic Deicing Area
Oil/Water Seperator
Barnstable Road
Current Deicing Area
ME-1
ME-3
ME-2
Maher Treatment Plant
Off-Site 1,4-Dioxane Plume Impacting Airport and Others
Estimated Disposal Site Boundary
(Based on Maximum PFAS Plume Model Migration above 0.02 ug/L in Phase IV Report)

Legend

- Airport Monitoring Wells
- Barnstable Fire Training Academy Monitoring Wells
- Soil Samples
- Surface Water Samples Completed by Airport
- Drinking Water Wells
- Barnstable Municipal Airport Property Boundary
- Groundwater Contours
- Estimated Extent of Airport AFFF PFAS Plume
- Estimated Extent of Off-Site BFTA Plume
- Estimated Extent of Off-Site 1,4-Dioxane Plume
- Estimated Extent of Off-Site 1,4-Dioxane Plume

N

0 750

1 in = 779 feet

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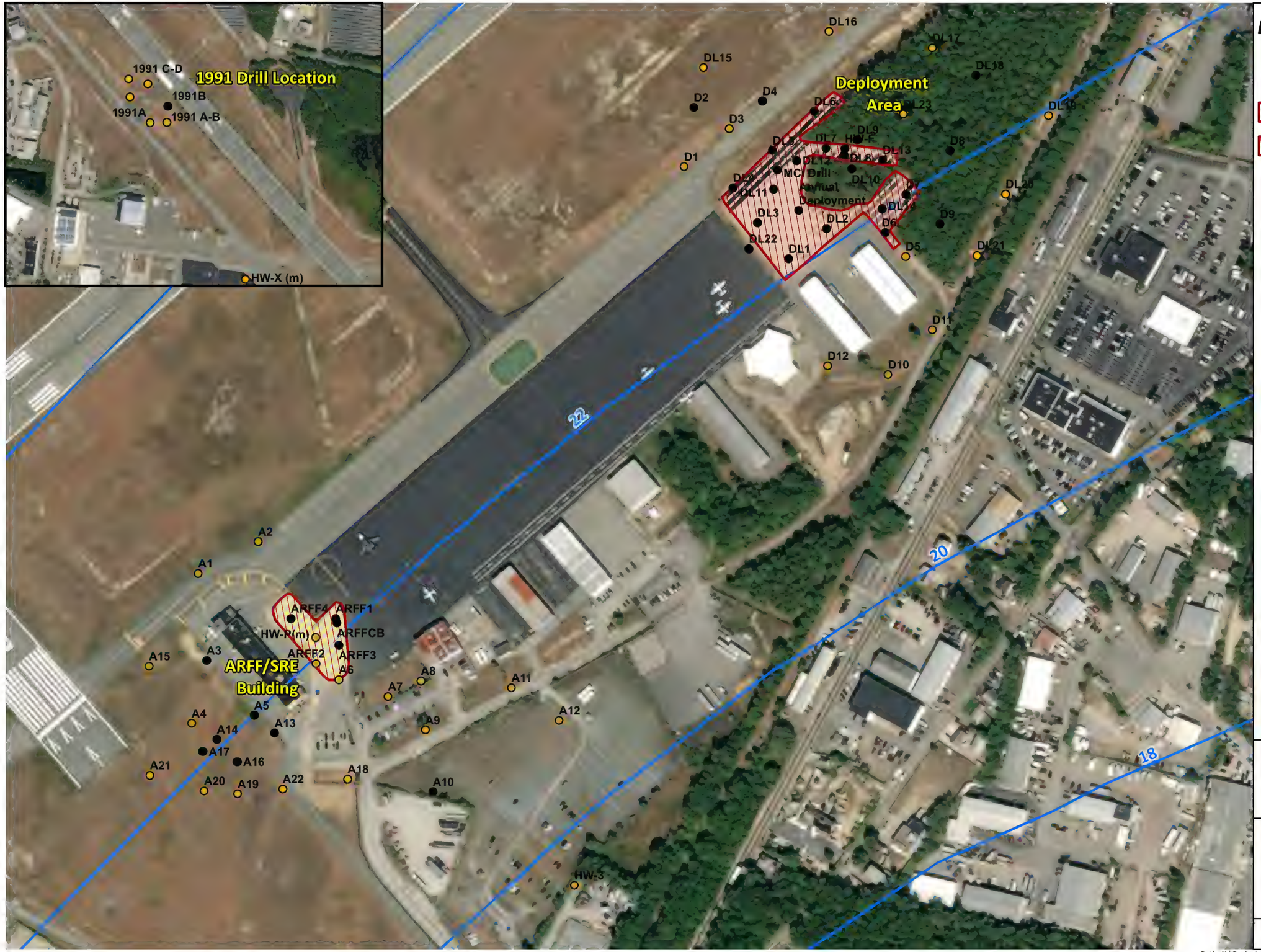
Estimated Airport AFFF Disposal Site Boundary
Cape Cod Gateway Airport
Hyannis, MA

Date: 11/8/2022 Figure 2

* Cape Cod Commission (CCC) Groundwater Contours



Legend

- Groundwater Contours*
- Deployment Area Liner Cap
- ARFF Asphalt Cap
- Soil Sample Location below Method 1 S-1/GW-1 Standard for all Six PFAS Compounds
- Soil Sample Exceeding Method 1 S-1/GW-1 for at least one of the six regulated PFAS compounds

Method
PFHpA = 0.5 ug/kg
PFHxS = 0.3 ug/kg
PFOA = 0.72 ug/kg
PFNA = 0.32 ug/kg
PFOS = 2 ug/kg
PFDA = 0.3 ug/kg

Soil Sample Location for TOC

N

0 225

1 in = 225 feet

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Soil Sample Locations
Barnstable Municipal Airport
Hyannis, MA

Date: 10/4/2021 Figure 3

** Cape Cod Commission (CCC) Groundwater Contours*

Path: K:\Projects\HYA\17027 BMA PFOS 1-4 IRA\GIS\Maps\Soil Sample Locations.mxd

Legend

- PFAS Monitoring Wells
- Surface Water Samples Completed by Airport
- Drinking Water Wells
- Barnstable Municipal Airport Property Boundary
- Groundwater Contours*

N

0 750

1 inch = 750 feet

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Surface Water and Monitoring Well Locations
Barnstable Municipal Airport
Hyannis, MA

Date: 10/4/2021

Figure 4

* Cape Cod Commission (CCC) Groundwater Contours

Path: K:\Projects\HYA\17027 BMA PFOS 1-4 IRA\GIS\Maps\200408_Well Locations.mxd

Legend

- Groundwater Contours*
- Samples exceeding MassDEP S-1/GW-1 Standard
- ARFF Asphalt Cap
- Deployment Area Liner Cap

Maximum Concentration of Total PFAS Detected in Soil (ug/kg)

- 0 - 0.5
- 0.5 - 1
- 1 - 5
- 5 - 20
- 20 - 100
- 100 - 200
- 200 - 500
- 500 - 1000
- 1000 - 2000
- 2000 - 6000

Notes:
1. Multiple circles indicates samples at different depths. The larger the circle, the deeper the sample.

2. Total PFAS is the sum of all laboratory reported PFAS analytes.

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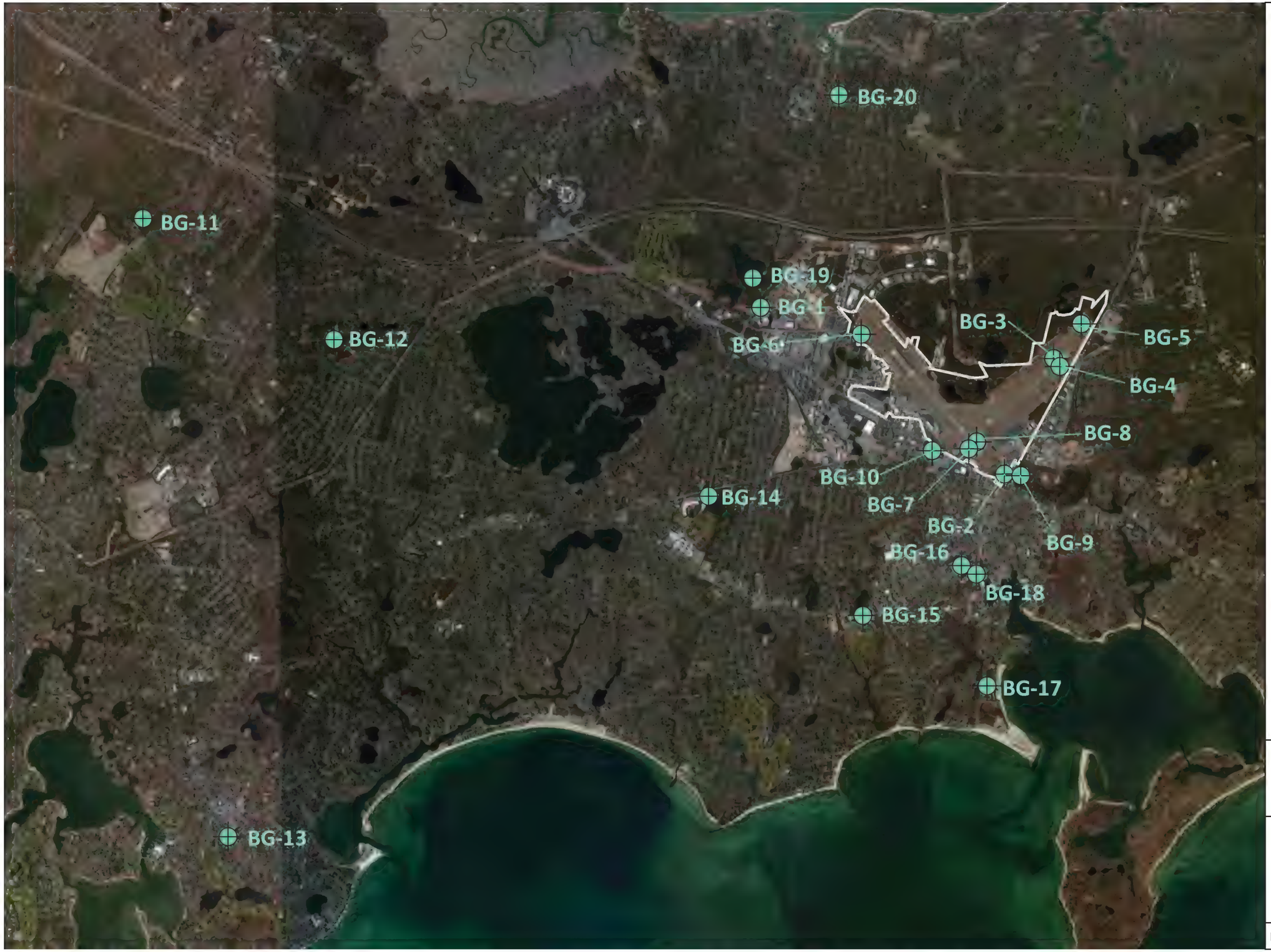
Sum of Six PFAS in Soil
Cape Cod Gateway Airport
Hyannis, MA

Date: 8/11/2021 Figure 5

Path: H:\Projects\HYA\21084 PFOS Phase III\GIS\Maps\201030_SoilPFASTotalZoom.mxd

* Cape Cod Commission (CCC) Groundwater Contours



Legend

- Background PFAS sample locations
- Barnstable Municipal Airport Property Boundary

N

0 1,750 Feet

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Background
PFAS Sample Locations
Cape Cod Gateway Airport
Hyannis, MA

Date: 11/25/2020 Figure 6

Path: H:\Projects\HYA\17027 BMA PFOS 1-4 IRA\GIS\Maps\180110_PFOS_BackgroundSampleLocations.mxd

Legend

- Soil Sample Location 6-24 A Composite (0-1')
- Soil Sample Location 6-24 A Composite (1-2')
- Soil Sample 6-24 B (0-1') Composite Locations
- Soil Sample 6-24 B (1-2') Composite Locations
- Soil Sample 6-24 C (0-1') Composite Locations
- Soil Sample 6-24 C (1-2') Composite Locations
- Barnstable Municipal Airport Property Boundary

N

0 375

1 inch = 375 feet

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Surficial Soil Sampling
Runway 6/24 Locations
Cape Cod Gateway Airport
Hyannis, MA

Date: 3/17/2022 Figure 7

* Cape Cod Commission (CCC) Groundwater Contours

Path: H:\Projects\HYA\17027 BMA PFOS 1-4 IRA\GIS\Maps\220302_Surficial Soil Sampling.mxd

GP-2
GP-5
Israel Pond
MD-4
MD-3
MD-2
MD-1
Flint Rock Pond
Barnstable Fire Training Academy
Lamson Pond
Mary Dunn Pond
Lewis Pond
Upper Gate Pond
Air-1
Historic Deicing Pad
Former ARFF/SRE Building
HW-401s
Current Deicing Pad (6" thick competant asphalt sourounds that drain)
Yarmouth Road
Fresh Pond
30
29
28
24
22
20
18
14
132

HW-N
2019 ND

HW-A(d)
2017 ND
2019 ND

HW-V(m)
2020 **0.8**

HW-O
2019 ND

HW-1
2015 ND
2019 ND

HW-5
2015 ND

HW-12
2015 ND

HW-29
2019 ND

OW-6
2015 ND
2019 ND

HW-U(d)
2020 **0.73**

HW-B(d)
2017 ND

HW-4m/4d
2017 (M) ND
2017 (D) ND

HW-204
2019 ND

HW-X (s,m)
2021 ND

HW-207s/207d
2017 (d) ND
2019 (d) ND
2019 (s) ND

HW-19d
2017 ND
2019 ND

HW-L (s,m,d)
2019 (d) **0.727**
2020 (s) ND
2020 (m) ND
2020 (d) **0.75**

2015 (m) ND
2015 (d) ND
2015 (dd) **0.926**
2017 (dd) **0.838**
2018 (d) ND
2018 (dd) **0.732**
2020 (d) ND

HW-E
2021 ND

HW-J
2021 ND

OW-18m/18d
2017 (m) ND
2017 (d) **0.552**
2018 (d) ND
2020 (d) **0.35**

OW-19m/19d
2017 (m) ND
2017 (d) **0.8**
2018 (d) ND
2018 (d) **0.3**

HW-C
HW-N
HW-A (s,d)
HW-V (m)
HW-M
HW-O
HW-1
HW-12
HW-29
HW-X (s,m)
HW-23
HW-B (s,d)
HW-U (s,m,d)
HW-D (m,d,dd)
HW-G (s,m,d)
HW-L (s,m,d)
HW-P (s,m)
HW-Q (s,m)
HW-302
HW-301
HW-3
HW-300
HW-K
HW-2
RB-1 (s,m)
OW-9(m,d,dd)
OW-18 m,d
HW-W (m,d,dd)
OW-19 s,m,d
ME-1
ME-2
ME-3
HW-E
HW-F
HW-R
HW-H
HW-I (s,m,d)
HW-J
HW-T (s,m)
HW-S (s,m)

Legend

- Monitoring Wells
- ND — Not detected by the laboratory above the reporting limit
- 0.2 — 1,4 Dioxane Below MassDEP Limit (0.3 ug/L)
- **0.8** — 1,4 Dioxane Above Method 1 GW-1 Standard (0.3 ug/L)
- Drinking Water Wells
- Barnstable Municipal Airport Property Boundary
- Groundwater Contours

N

0 750

1 inch = 750 feet

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1,4 Dioxane Results In Groundwater Cape Cod Gateway Airport Hyannis, MA

Date: 10/1/2021 Figure 8

Path: H:\Projects\HYA\17027 BMA PFOS 1-4 IRA\GIS\Maps\210409_DioxaneMap.mxd

Legend

- Groundwater Contours
- Approximate Location of TOC Sample
- Deployment Area Liner Cap
- ARFF Asphalt Cap

N

0 400

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TOC Sample Locations
Cape Cod Gateway Airport
Hyannis, MA

Date: 8/9/2021 Figure 9

** Cape Cod Commission (CCC) Groundwater Contours*

Path: K:\Projects\HYA\17027 BMA PFOS 1-4 IRA\GIS\Maps\TOC Sample Locations.mxd

TABLES

Table 1
Community Notification List
Cape Cod Gateway Airport Public Involvement Plan

NAME	ADDRESS
Brad Schiff	bschiff@pierce-cote.com
Bronwen Walsh	bwalsh@barnstablepatriot.com
Chanda Beaty	chanda123@yahoo.com
David Dow	ddow420@comcast.net
Geoff Spillane	gspillane@capecodonline.com
Gerard Martin	gerard.martin@mass.gov
Gordon Starr	gordon.m.starr@gmail.com
Keith Lewison	keith.lewison@gmail.com
Lisa Connors	lconnors@pierce-cote.com
Paul Neary	nearyprecinct6@gmail.com
Steve Seymour	steveseymour@comcast.net
Tom Cambareri	tomcambareri@gmail.com
Sue Phelan	suephelan@comcast.net
Chris Greeley	greeleyc@comcast.net
Laurie Ruszala	lruszala@yarmouth.ma.us
Paul phalan	phalanpaul@gmail.com>
Amanda Rose	504 Pitchers Way Hyannis, MA 02601
Angela Gallagher	MassDEP Southeast Regional Office Bureau of Waste Site Cleanup 20 Riverside Drive Lakeville, MA 02347
Anthony Alva	184 Mockingbird Lane Marstons Mills, MA 02646
Araceli Alcantara	67 Coolidge Road West Yarmouth, MA 02673
Arthur Beatty	699 Cotuit Road Marstons Mills, MA 02648
Bruce Murphy	Health Department Town of Yarmouth 1146 Route 28 South Yarmouth, MA 02664
Ronald Beaty	245 Parker Rd. West Barnstable, MA 02668
Rong Jian Liu	5 Fishing Brook Road Yarmouth, MA 02664
Scott Beaty	29 Washington Avenue West Yarmouth, MA 02673
Sue Phelan	Green Cape - PO Box 631 West Barnstable, MA 02668
Sylvia Laselva	358 Sea Street Hyannis, MA 02673
Vilson Kote	106 Betty's Path West Yarmouth, MA 02673

NAME	ADDRESS
Charlie Bloom	29 Oak Street Hyannis, MA 02601
Cheryl Osimo	MBCC PO Box 202 Franklin, MA 02038
Christian Cook	37 Maple Avenue Hyannis, MA 02601
Daniel Knapik	Town Administrator Town of Yarmouth 424 Rte. 28 West Yarmouth, MA 02673
Daniel Santos	Department of Public Works Town of Barnstable 397 Main Street Hyannis, MA 02601
Darcy Karie	Conservation Commission Town of Barnstable 397 Main Street Hyannis, MA 02601
David Beaty	137 Harbor Bluff Road Hyannis, MA 02601
Eric Kristofferson	Hyannis Fire Department 95 High School Road Ext. Hyannis, MA 02601
Hans Keijser	Department of Public Works Town of Barnstable 397 Main Street
Janine Voiles	67 Coolidge Road West Yarmouth, MA 02673
Jeanny Fichter	1640 Old Stage Rd. West Barnstable, MA 02668
Karl Von Hone	Yarmouth Natural Resources Town of Yarmouth 424 Route 28 West Yarmouth, MA 02673
Luiz Gonzaga	92 High School Rd. Hyannis, MA 02601
M. Curley	39 Oak Ridge Road Osterville, MA 02655
Thomas McKean	Board of Health Town of Barnstable 397 Main Street Hyannis, MA 02601
Maia Fitzstevens	Silent Spring Institute 320 Nevada Street, Suite 302 Newton, MA 02460
Mainur Kote	106 Betty's Path West Yarmouth, MA 02673
Mainur Kote	106 Betty's Path West Yarmouth, MA 02673
Margo Pisacano	73 Harbor Bluff Road Hyannis, MA 02601
Mark Ells	Town Manager Town of Barnstable 397 Main Street Hyannis, MA 02601
Mark Forest	Board of Selectmen c/o Town Administrator's Office 1146 Route 28 South Yarmouth, MA 02664
Mr. Michael Gorenstein	Department of Public Works Town of Barnstable 397 Main Street
Nancy Wentzel-Johnson	PO Box 342 Hyannis, MA 02601
Peter Burke	Hyannis Fire Department 95 High School Road Ext. Hyannis, MA 02602
Richard A. Zoino	92 High School Road Hyannis, MA 02601
Richard Rougeau	306 Longbeach Road Centerville, MA 02632

Table 2 Soil Results for PFAS Compounds ug/kg

Sample Location				ARFF Building																																
Samp e ID	Method 1 Standard		UCl	ARFF-1 (0-1')	ARFF-1 (2')	ARFF-1 (4)	ARFF-2 (0-1')	ARFF-3 (0-1')	ARFF-3 (10-12)	ARFF-4 (0-1')	ARFFCB (0-1)	A1 (0-1)	AJ (0-1)	A3 (0-1)	A4 (0-1')	A5 (0-1')	A5 (2-4)	A6 (0-1')	A7 (0-1)	A8 (0-1)	A9 (0-1)	A10 (0-1')	A11 (0-1')	A12 (0-1')	A13 (0-1')	A14 (0-1')	A14 (0-1')	A15 (0-1')	A15 (0-1')	A16 (0-1')	A17 (0-1')	A18 (0-1)	A19 (0-1)	AJ0 (0-1)	AJ0 (2-4)	AJ1 (0-1)	AJ2 (0-1)	HW-P(M) [8-10]	HW-P(M) [18-20]	DI 1(0-1')
Sample Date	S-1/GW-1	S-1/GW-3		6/20/2017	9/26/2017	9/26/2017	6/20/2017	9/26/2017	10/9/2018	9/26/2017	9/26/2017	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	9/24/2020	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	2/27/2019	9/29/2020	2/27/2019	5/13/2020	2/27/2019	5/13/2020	9/17/2020	9/17/2020	9/29/2020	9/24/2020	9/24/2020	9/24/2020	9/24/2020	9/29/2020	9/18/2020	9/18/2020	6/20/2017
Perfluoroheptanoic acid (PFHpA)	0 5	100	4,000	**0.82 J**	**1.8**	**0.66 J**	0.17 U	**0.60 J**	0.32 J	**0.75 J**	**0.60 J**	0 19 U	0.19 U	0.38 J	0.19 U	**1.1**	0 089 U	0 19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**<2.0**	0.396 J	**<1.9**	**0.51 J**	**<2.0**	0.21 U	0 067 J	**1.07**	0 076 J	0.101 J	0.09 U	0.09 U	0.045 U	0.096 J	0.044 U	0.043 U	0 80 J
Perfluorohexanesulfonic acid (PFHxS)	0 3	300	4,000	0.23 U	0.23 U	0 23 U	0.23 U	**0.64 J**	0.24 U	0.23 U	0.23 U	0 24 U	0 24 U	0.24 U	0.24 U	0.24 U	0 12 U	0 24 U	0.24 U	0.24 U	0 24 U	0.24 U	0 24 U	**<2.0**	0.058 U	**<1.9**	0.24 U	**<2.0**	0.21 U	0 085 J	0.058 U	0 054 U	0.059 U	0 121 U	0 121 U	0 06 U	0 055 U	0.059 U	0.058 U	0.23 U
Perfluorooctanoic acid (PFOA)	0.72	300	4,000	**0.75 J**	**2.6**	**0.75 J**	0.26 U	**0.78 J**	**1.9**	**0.97 J**	**0.90 J**	0 25 U	0.25 U	0.37 J	0.30 J	**1.0**	0 228 J	0 25 U	0.25 U	0.25 U	0.34 J	0.25 U	0.25 U	**<2.0**	0.67 J	**<1.9**	0 68 J	**<2.0**	0.14 U	0 088 J	**0.989**	0 111 J	0.129 J	0.196 J	0.147 J	0.042 U	0 069 J	0 089 J	0 046 J	0 26 U
Perfluorononanoic ac d (PFNA)	0.32	300	4,000	**2.5**	**5.7**	**1.4**	0.20 J	**0.91 J**	**3.1**	**2.9**	0.17 U	0 22 U	0.22 U	**0.51 J**	0.22 U	**0.87 J**	0 148 U	0 22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	**<2.0**	**1.2**	**<1.9**	**0.56 J**	**<2.0**	0.15 U	0 119 J	**0.774 J**	0 283 J	0.246 J	0.15 U	0.15 U	0.075 U	0.11 J	0.073 U	0.072 U	0.17 U
Perfluorooctane sulfonate (PFOS)	2	300	4,000	**4.5**	**2.7**	1.1	0.29 J	**4.4**	1.1	1.0	1.1	0 26 U	0.26 U	0.29 J	0.26 U	0.26 U	0.25 V U	0 26 U	0 38 J	0.26 U	0.85 J	0.26 U	0.26 U	**<2.0**	1.3	<1.9	0 32 J	<2.0	0.29 J	**2.02**	0.573 J	1.15	0.611 J	0.258 U	0.26 U	0.276 J	0.599 J	0.0127 U	0.0124 U	0 40 J
Perfluorodecanoic Acid (PFDA)	0.3	300	4,000	**4.4**	**1.2**	**0.62 J**	0.13 U	**1.6**	0.28 U	**0.85 J**	0.13 U	0 28 U	0.28 U	**0.42 J**	0.28 U	**1.4**	0 133 U	0 28 U	0.28 U	0.28 U	0.28 U	**0.33 J**	0.28 U	**<2.0**	**0.34 J**	**<1.9**	**0.95 J**	**<2.0**	0.15 U	0 074 J	0.147 J	0 146 J	0 066 U	0.134 U	0.134 U	0.067 U	0.119 J	0.065 U	0.064 U	**0.63 J**
6 2 Fluorotelomer sulfonate (6:2 FTS)	NA	NA	NA	0.93 J	0.74 J	1	0.23 U	0 61 J	4.2	0.65 J	2.2	0 26 U	0.26 U	0.26 U	0.26 U	18	0.355 U	0 26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	<2.0	0.173 U	<1.9	0.25 U	<2.0	0.22 U	0.17 U	0.172 U	0.161 U	0 175 U	0.358 U	0.359 U	0.179 U	0.164 U	0.221 I	0.172 U	0.39 J
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six																																							
Total PFAS	NA	NA	NA	120.06	41.75	46.85	1.16	23 72	11.03	11.9	95.43	0	0	6.2	1.14	161.07	0 613	1.5	1.35	0.48	1.92	1.1	0.43	0	0 0	5.2	0	13 15	0.0	0 45	3 131	11.267	2.652	1 409	0.316	0.147	0.571	1.412	0.411	0.09	11.14
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	NA	NA	12.97	14	4.53	0.49	8.93	6.42	6.47	2.6	0	0	1.97	0.3	5.27	0.228	0	0.38	0	1.19	0.33	0	0	0	3.916	0	3	0	0.29	2.453	3.553	1.764	1.087	0.196	0.147	0.276	0.953	0.089	0.046	1.33

Sample Location				Deployment Area																																
Sample ID	Method 1 Standard		UCl	DL2 (0-1')	DL2 2	DL2 4	DL3 (0-1')	DL3 2'	DL3 4	DL4 (0-1')	DL4 2	DL4 4'	DL5 (0-1')	DL5 2'	DL5 4	DL6 (0-1')	DL7 (0-1)	DL8 (2')	DL8 (4')	DL9 (0-1')	DL10 (0-1)	DL11 (0-1)	DL11 (4-6')	DL11 (10-12")	DL11 (14-16')	DL12 (0-1)	DL13 (0-1)	DL14 (0-1')	DL14 (4-6')	DL14 (10-12")	DL14 (14-16')	DL15 (0-1)	DL16 (0-1)	DL17 (0-1)	DL18 (0-1)	DL19 (0-1)	DL20 (0-1)	DL21 (0-1)	DL22 (2-4)	DL22 (6-8)
Sample Date	S-1/GW-1	S-1/GW-3		6/20/2017	9/26/2017	9/26/2017	6/20/2017	9/26/2017	9/26/2017	6/20/2017	9/26/2017	9/26/2017	6/20/2017	9/26/2017	9/26/2017	6/20/2017	6/20/2017	6/20/2017	9/26/2017	6/20/2017	6/20/2017	9/26/2017	8/20/2019	10/4/2018	10/4/2018	10/4/2018	9/26/2017	9/26/2017	9/26/2017	10/4/2018	10/4/2018	10/4/2018	9/30/2020	9/30/2020	9/25/2020	9/25/2020	9/25/2020	9/25/2020	9/25/2020	9/25/2020	9/25/2020
Perfluoroheptanoic ac d (PFHpA)	0 5	100	4,000	0 19	**1.2**	**1.2**	0 48 J	**0.84 J**	0 17 U	0 17 L	0 17 L	0 31 J	0 17 U	**2.5**	0 40 J	0 50 J	**5.0**	**2.5 J**	**2.9 J**	**4.7 J**	**0.66 J**	**1.3**	**1.3**	0 11 J	0 23 J	**1.2**	**1.6**	**4.9**	0 46 J	0 19 L	**1.4**	0 175 J	0 138 J	0 167 J	0 319 J	0 145 J	0 157 J	0 158 J	0 109 J	0 481 J
Perfluorohexanesulfonic acid (PFHxS)	0.3	300	4,000	**1.8**	**1.3**	**0.59 J**	**0.34 J**	0 23 U	0 23 U	0 23 U	0 23 U	0.23 U	**0.49 J**	**0.49 J**	0 23 U	0 23 U	0 23 U	**2.3 U**	**2.3 U**	**2.3 U**	**0.35 J**	**0.94 J**	**0.82 J**	**<0.9**	0.24 U	0.24 U	0.24 U	0 23 U	**0.71 J**	0 24 U	0 24 U	**0.74 J**	0 235 U	0 057 U	0.224 U	0.159 J	0 194 U	0.21 U	0 212 U	0.057 U	0 07 J
Perfluorooctanoic acid (PFOA)	0.72	300	4,000	**1.6**	**4.1**	**0.74 J**	**0.80 J**	0 26 U	0 26 U	**0.83 J**	0.26 U	0.26 U	**3.7**	**1.6**	0.26 U	0 26 U	**4.2 J**	**25**	**22**	0 68 J	**1.7**	**4.7**	**5.2**	**2.9**	**1.9**	0 50 J	**4.6**	**2.4**	**23**	0 58 J	0 32 J	**2.9**	0 144 J	0.223 J	0.166 J	**0.979 J**	0.135 U	0.146 U	0 159 J	0.44 J	**1.32**
Perfluorononanoic acid (PFNA)	0.32	300	4,000	**0.81 J**	**2.5**	0 17 U	**0.55 J**	0 17 U	0 17 U	0 17 U	**3.7**	0 19 J	0 17 U	0 17 U	0 19 J	**9.6 J**	**46**	**1.7 U**	**16**	0 22 J	0 17 U	**16**	**2.4**	**2.5**	0 22 U	0 22 U	**7.3**	**1.5**	**10**	0 22 U	0 22 U	**10**	0 292 U	0 285 J	0.277 U	0.296 J	0.241 U	0.261 U	0.263 U	**5.46**	**2.66**
Perfluorooctane sulfonate (PFOS)	2	300	4,000	**12**	1.5	0.21 U	0 51 J	0 21 U	0 21 U	2.0	0 21 U	0 50 J	0 21 U	0 21 U	0 21 U	**3.9 J**	**14**	**2.1 U**	0 38 J	0 26 J	**29**	1.5	0 26 U	0 26 U	0 26 U	**23**	0 66 J	**7.6**	0 26 U	0 26 U	**2.3**	0.505 U	0.575 J	0.481 U	1.05 J	0 418 U	0.452 U	0.456 U	**20.3**	**8.85**
Perfluorodecanoic Acid (PFDA)	0.3	300	4,000	0 13 U	0.13 U	0 13 U	**1.4**	0 13 U	0.13 U	**1.3**	0.13 U	0 13 U	0.13 U	0 13 U	0 13 U	0.13 U	**1.3 U**	**1.3 U**	**1.3 U**	0 13 U	0 13 U	**1.8**	**8.7**	0 28 U	0 28 U	0 28 U	**0.66 J**	**7.4**	**9.6**	0 28 U	0 28 U	0 28 U	0 26 U	0 181 J	0 248 U	0 167 J	0 215 U	0 233 U	0 235 U	**0.834 J**	**0.383 J**
6 2 Fluorotelomer sulfonate (6:2 FTS)	NA	NA	NA	0.23 U	0.23 U	0.57 J	3.1	1.5	1	0 24 J	0.23 U	1.7	0.23 U	0 23 U	0.23 U	2	290	1600	900	0.23 U	0.23 U	7.8	30	4 1	4.4	6.7	62	320	230	0.67 J	0 30 J	64	0.698 U	0 168 U	0 664 U	0.19 U	0.577 U	0 625 U	0.629 U	7.49	11.7
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six																																							
Total PFAS	NA	NA		24.41	12.17	2.38	84 86	9.56	13.81	9 6	0.88	5.9	11.03	2.49	0.5	18.59	404.4	1727.2	949.6	6.38	9.1	85 22	91.5	11.07	6.82	7.63	108.56	521.26	598.24	50 11	21.22	116.64	4.523	2.269	0.628	**4.84**	0	0	0.68	66.813	41.588
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	NA	NA	18.11	10.6	1.81	4.44	0	0	7.14	0	4.2	6.88	2.49	0.5	5.19	20.2	87.9	26.7	2.29	4.2	54.42	19.6	6.7	2.21	0.73	36.76	13.56	55.81	0.94	0.32	17.34	0.334	1.402	0.166	2.97	0	0	0.159	27.15	13.764

Sample Location				Deployment Area																
Samp e ID	Method 1 Standard		L/Cl	DL22 (18-20)	DL23 (0-1)	D1 (0-1)	D2 (0-1)	D3 (0-1)	D4 (0-1')	D5 (0-1')	D6 (0-1')	D7 (0-1')	D8 (0-1')	D9 (0-1)	D10 (0-1')	D11 (0-1')	D12 (0-1')	HW-3 (10-12')	HW-5 (14-16')	HW-5 (0-1')	MCI Dri l (0-1)	Annual Deployment (0-1)
Sample Date	S-1/GW-1	S-1/GW-3		9/25/2020	9/29/2020	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	10/4/2018	10/4/2018	10/8/2018	12/9/2016	12/9/2016
Perfluoroheptanoic acid (PFHpA)	0 5	100	4,000	0 073 J	0 24 J	0 19 U	0 21 J	0 19 U	**0.95 J**	0 22 J	0 25 J	**7.8**	**1.0**	**2.7**	0 19 U	0 19 L	0 19 U	0 32 J	**1.3**	0 19 U	**8.4**	**20**
Perfluorohexanesulfonic acid (PFHxS)	0.3	300	4,000	0 059 U	0 134 J	0 24 U	0 24 U	0 24 U	0 24 U	0 24 U	0 24 U	0 24 U	**0.31 J**	0 24 U	0 24 U	0 24 U	0 24 U	0 24 U	0 24 U	0 24 U	**0.5 J**	**4 U**
Perfluorooctanoic acid (PFOA)	0.72	300	4,000	0 176 J	0 471 J	0 25 U	0 33 J	0 25 U	**1.1**	0 25 U	0 28 J	**14**	**2.2**	**3**	0 25 U	0 25 U	0 25 U	0 25 U	**1.4**	0 25 U	**23**	**100**
Perfluorononanoic acid (PFNA)	0.32	300	4,000	**0.476 J**	0 176 J	0 22 U	**0.67 J**	0 22 U	**0.98 J**	0 22 U	0 22 U	**10**	**0.59 J**	**0.83 J**	0 22 U	0 22 U	0 32 J	0 22 U	0 22 U	0 22 U	**14**	**31**
Perfluorooctane sulfonate (PFOS)	2	300	4,000	1 18	0 725 J	0 26 U	0 66 J	0 38 J	**2.9**	0 26 U	0 26 U	**3.4**	**2.1**	0 67 J	0 54 J	0 91 J	0 44 J	0 26 U	0 26 U	0 26 U	**24**	1 9 J
Perfluorodecanoic Acid (PFDA)	0.3	300	4,000	0 065 U	0 266 J	0 28 U	0 28 U	0 28 U	**0.40 J**	0 28 U	**0.66 J**	**8.6**	**1.3**	**1.6**	0 28 U	0 28 U	0 28 U	0 28 U	0 28 U	0 28 U	**20**	**69**
6 2 Fluorotelomer sulfonate (6:2 FTS)	NA	NA	NA	2.67	0.181 U	0.26 U	0 26 U	0 26 U	0 26 U	0 78 J	1.2	12	0 26 U	0 26 U	0 26 U	24	140	0 26 U	270	4300
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six																				
Total PFAS	NA	NA	NA	11.352	4.053	0 74	1.87	0.94	11.42	3 01	9 06	151.24	24 61	43 41	0.83	1.62	1.47	25 27	146.5	0	1,524	5,972.9
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	NA	NA	1.905	2.012	0	1.87	0.38	6.33	0.22	1.19	43.8	7.5	8.8	0.54	0.91	0.76	0.32	2.7	0	89.9	221 9

Sample Location				1991 Drill Location						Old ARFF/SRE Building
Sample ID	Method 1 Standard		L/Cl	1991A (0-1)	1991B (0-1)	1991C (0-1')	1991D (0-1')	1991A-B (3-4)	1991C-D (2-3)	HW-X(m) [7-9]
Sample Date	S-1/GW-1	S-1/GW-3		8/14/2018	8/14/2018	8/14/2018	8/14/2018	12/14/2018	12/14/2018	9/7/2021
Perfluoroheptanoic acid (PFHpA)	0.5	300	4,000	0 19 U	0.19 U	0 19 U	0.19 U	0.19 U	0.19 U	0 043 U
Perfluorohexanesulfonic acid (PFHxS)	0.3	300	4,000	0 24 U	**0.66 J**	0 24 U	0 24 U	0 24 U	0 24 U	0 058 U
Perfluorooctanoic acid (PFOA)	0.72	300	4,000	0 25 U	0.26 J	0 25 U	0.25 U	0.25 U	0 25 U	0.04 U
Perfluorononanoic acid (PFNA)	0.32	300	4,000	0.22 U	0.22 U	0.22 U	0.30 J	0 22 U	0 22 U	0.072 U
Perfluorooctane sulfonate (PFOS)	2	300	4,000	0.49 J	1.1	0.55 J	0.36 J	0 30 J	0.42 J	0.124 U
Perfluorodecanoic Acid (PFDA)	0.3	300	4,000	0 28 U	0 28 U	0 28 U	0 28 U	0 28 U	0 28 U	0.064 U
6 2 Fluorotelomer sulfonate (6:2 FTS)	NA	NA	NA	0 26 U	0.26 U	0 26 U	0.26 U	0.26 U	0 26 U	0.171 U
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six										
Total PFAS	NA	NA	NA	0.49	3.18	0.55	0 66	0.3	0.42	0 139
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	NA	NA	0.49	2.02	0.55	0.66	0.3	0.42	0.124 U

Notes
< = Not detected by the laboratory above the reporting limit. Reporting limit shown.
J = Estimated concentration between the method detection limit and reporting limit
Results in ug/kg, micrograms per kilogram
J+ Not detected by the laboratory above the method detection limit. Method detection limit shown
Bold results above the Method 1 S-1/GW-1 standard.
Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <).
Sum of six includes estimated values and does not include non-detects (L or <).
UCl = Upper Concentration Limit

Table 3. Groundwater Results for PFAS Compounds ug/L

Sample Location		North Ramp Area													Lewis Pond Area	Airport Road/Iyannough Road Area									
Sample ID		HW-1	HW-1	HW-1	HW-4M	HW-4M	HW-5	HW-5	HW-5	HW-5	HW-23	HW-23	HW-19D	HW-19D	HW-X(s)	HW-X(m)	HW-401S	HW-A(S)	HW-B(S)	HW-B(S)	HW-B(D)	HW-C	HW-M	HW-N	HW-O
Sample Date		7/1/2016	6/20/2017	11/1/2018	4/5/2017	3/25/2022	7/1/2016	4/7/2017	11/1/2018	3/25/2022	6/20/2017	11/1/2018	6/20/2017	11/7/2018	9/10/2021	9/10/2021	4/7/2017	4/7/2017	4/7/2017	10/26/2018	10/26/2018	4/7/2017	6/24/2019	6/24/2019	7/2/2019
TOC Elevation	UCL	51.51	51.51	51.51	54.02	54.02	54.98	54.98	54.98	54.98	50.65	50.65	49.10	49.10	NA	NA	41.58	55.34	51.84	51.84	51.95	69.25	53.69	49.49	43.46
Depth to Groundwater		21.63	25.00	21.83	26.20	25.00	24.94	26.75	25.27	25.31	22.70	24.01	21.29	22.19	24.74	25.21	17.95	24.62	22.26	21.59	21.66	38.50	20.32	15.48	3.62
Groundwater Elevation		29.88	26.51	29.68	27.82	29.02	30.04	28.23	29.71	29.67	27.95	26.64	27.81	26.91	NA	NA	23.63	30.72	29.58	30.25	30.29	30.75	33.37	34.01	39.84
Total Well Depth		30.84	30.84	30.84	32.32	32.32	27.80	27.80	27.80	27.80	28.11	28.11	41.30	41.30	29.24	36.82	23.60	32.00	30.23	30.23	57.20	42.15	26.92	22.33	14.10
Perfluoroheptanoic acid (PFHpA)	100,000	0.01	0.0042 J	0.013 J	0.007 J	0.003	0.0041	0.0084 J	0.0074 U	0.0048	0.0045J	0.0098 J	0.0052 J	0.0080 J	0.0061	0.0034	0.0043 J	0.0048 J	0.049	0.012 J	0.0074 U	0.0033 U	0.007	0.0034	<0.002
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.018	0.065	0.018 J	0.02	0.011	0.011	0.018 J	0.0056 U	0.013	0.021	0.023	0.046	0.045	0.047	0.0021	0.011 J	0.0079 J	0.044	0.047	0.0056 U	0.0034 U	0.016	0.033	0.0043
Perfluorononanoic acid (PFNA)	100,000	<0.002	0.0057 J	0.0087 U	0.0046 U	0.0018 U	<0.002	0.0046 U	0.0088 J	0.0018 U	0.0038 U	0.0087 U	0.0065 J	0.0087 U	0.00049 J	0.002	0.0046 U	0.0046 U	0.0046 U	0.0087 U	0.0087 U	0.0046 U	<0.002	<0.002	<0.002
Perfluorooctanoic acid (PFOA)	100,000	0.033	0.022	0.031	0.011 J	0.013	0.031	0.020 J	0.011 J	0.023	0.0046 U	0.011 J	0.017 J	0.014 J	0.013	0.0062	0.0046 U	0.0026 U	0.0094 J	0.020 J	0.012 J	0.0026 U	0.027	0.0088	0.0039
Perfluorooctane sulfonate (PFOS)	5,000	0.017	0.24	0.028	0.043	0.025	0.12	0.052	0.12	0.048	0.0079 J	0.015 J	0.061	0.069	0.068	0.034	0.012 J	0.0026 U	0.026	0.019 J	0.010 J	0.0026 U	0.0074	0.004	0.017
Perfluorodecanoic Acid (PFDA)	100,000	NA	0.0040 U	0.0061 U	0.0040 U	0.0018 U	NA	0.0040 U	0.0061 U	0.0018 U	0.0040 U	0.0061 U	0.0040 U	0.0061 U	0.00050 U	0.0042	0.0040 U	0.0040 U	0.0040 U	0.0061 U	0.0061 U	0.0040 U	<0.002	<0.002	0.0021
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	NA	0.0032 U	0.0066 U	0.0038 J	0.0018 U	NA	0.0037 J	0.0066 U	0.0018 U	0.0032 U	0.0066 U	0.0032 U	0.0066 U	0.002 J	0.00035 U	0.004 J	0.0032 U	0.0032 U	0.0066 U	0.0066 U	0.0034 J	<0.002	<0.002	0.002 U
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six																									
Total PFAS	NA	0.078	0.4247	0.15	0.1162	0.0679	0.1661	3.0021	0.1507	0.1045	0.0745	0.0858	0.1758	0.16	0.18221	0.10025	0.0313	0.0779	0.4561	0.186	0.0465	0.0034	0.0927	0.0727	0.0585
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	**0.078**	**0.3369**	**0.09**	**0.081**	**0.052**	**0.1661**	**0.0984**	**0.1398**	**0.0888**	**0.0334**	**0.0588**	**0.1357**	**0.136**	**0.13459**	**0.0519**	**0.0273**	0.0127	**0.1284**	**0.098**	**0.022**	<0.0046	**0.0574**	**0.0492**	**0.0273**

Sample Location		Deployment Area																														
Sample ID		HW-I (s)	HW-I (s)	HW-I (s)	HW-I (s)	HW-I (s)	HW-I (s)	HW-I (s)	HW-I (s)	HW-I (s)	HW-I (s)	HW-I (m)	HW-I (m)	HW-I (m)	HW-I (m)	HW-I (m)	HW-I (m)	HW-I (m)	HW-I (m)	HW-I (m)	HW-I (m)	HW-I (d)	HW-I (d)	HW-I (d)	HW-I (d)	HW-I (d)	HW-I (d)	HW-I (d)	HW-I (d)	HW-J	HW-J	HW-J	HW-J
Sample Date		11/7/2018	5/8/2020	3/17/2021	9/8/2021	3/18/2022	8/2/2022	10/31/2022	2/2/2023	6/7/2023	12/5/2023	6/24/2019	5/8/2020	3/17/2021	9/8/2021	3/18/2022	8/2/2022	10/31/2022	6/7/2023	12/5/2023	6/24/2019	5/8/2020	3/17/2021	9/11/2021	3/18/2022	8/2/2022	10/31/2022	6/7/2023	12/5/2023	11/7/2018	3/17/2021	9/10/2021	3/16/2022
TOC Elevation	UCL	36.08	36.08	36.08	36.08	36.08	36.08	36.08	36.08	36.08	36.08	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.02	36.02	36.02	36.02	36.02	36.02	36.02	36.02	36.02	37.10	37.10	37.10	37.10
Depth to Groundwater		18.35	15.39	18.42	19.94	17.72	19.81	20.44	17.55	19.19	24.00	16.33	15.61	18.66	20.17	18.07	20.03	20.70	18.98	20.19	16.20	15.49	18.52	20.04	17.95	19.90	20.55	18.85	20.07	19.18	19.34	20.60	18.75
Groundwater Elevation		17.73	20.69	17.66	16.14	18.36	16.27	15.64	18.53	16.89	12.08	19.94	20.66	17.61	16.10	18.20	16.24	15.57	17.29	16.08	19.82	20.53	17.50	15.98	18.07	16.12	15.47	17.17	15.95	17.92	17.76	16.50	18.35
Total Well Depth		25.10	25.10	25.10	25.10	25.15	25.18	25.14	25.15	25.60	25.60	34.80	34.80	34.80	34.80	34.80	34.80	34.80	34.79	34.80	41.67	41.67	41.67	41.67	41.67	41.70	41.70	41.70	41.70	24.30	24.30	24.30	24.28
Perfluoroheptanoic acid (PFHpA)	100,000	0.2	0.54	0.032	0.097	0.098	0.2	0.065	0.021	0.106	0.1	0.0032	0.0012	0.00086 J	0.0014 J	0.0024	0.0017 U	0.00067 J	0.00116 J	0.0018 J	0.0053	0.0046	0.0065	0.0083	0.0079	0.012	0.0093	0.0108	0.023	0.025	0.044	0.02	0.13
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.18	0.22	0.021	0.036	0.06	0.11	0.026	0.011	0.0692	0.04	0.019	0.0091	0.0052	0.0078	0.0052	0.0032	0.0042	0.00592	0.0072	0.057	0.018	0.031	0.05	0.039	0.063	0.045	0.028	0.023	0.0056 U	0.088	0.01	0.15
Perfluorononanoic acid (PFNA)	100,000	0.16	0.082	0.065	0.033	0.21	0.12	0.04	0.028	0.235	0.15	<0.002	0.00078	0.00048 U	0.00046 J	0.00061 J	0.0017 U	0.00061 U	0.000518 J	0.00088 U	<0.002	0.00063 U	0.00075 J	0.00084 J	0.00077 J	0.0018 U	0.0011 J	0.00117 J	0.0014 J	0.028	0.035 J	0.015	0.062
Perfluorooctanoic acid (PFOA)	100,000	0.26	0.29	0.05	0.063	0.11	0.17	0.067	0.016	0.172	0.14	0.0061	0.0018	0.0014 J	0.0016 J	0.0016 J	0.0017 U	0.00076 J	0.000977 J	0.0013 U	0.0047	0.0028	0.0043	0.0053	0.0074	0.013 U	0.0096	0.0101	0.019	0.026	0.061	0.0091	0.13
Perfluorooctane sulfonate (PFOS)	5,000	0.066	0.04	0.028	0.02	0.52	0.43	0.036	0.024	0.708	0.14	0.014	0.014	0.013	0.016	0.011	0.005	0.0043	0.00676	0.0081	0.012	0.02	0.038	0.039	0.047	0.083	0.063	0.0719	0.094	0.13	0.25	0.08	0.15
Perfluorodecanoic Acid (PFDA)	100,000	0.012 U	0.00062 U	0.0038 U	0.00047 U	0.00043 U	0.0018 U	0.00065 U	0.0018 U	0.02 U	0.00072 U	<0.002	0.00062 U	0.00038 U	0.00050 U	0.00043 U	0.0017 U	0.00065 U	0.00174 U	0.00079 U	<0.002	0.00062 U	0.00038 U	0.00048 U	0.00043 U	0.0018 U	0.00065 U	0.000296 JF	0.00075 U	0.0061 U	0.0076 U	0.00050 U	0.00044 U
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	11	13	1.7	2.1	1.3	4.6	0.0013 U	0.48	1.53	0.001 U	<0.002	0.00039 U	0.0011 U	0.00037 U	0.00032 U	0.0017 U	0.0013 U	0.00174 U	0.0012 U	<0.002	0.0016	0.0011 U	0.00054	0.00086	0.0018 U	0.0013 U	0.00174 U	0.0011 U	0.68	0.44	0.13	1.6
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six																																	
Total PFAS	NA	13.346	15.5383	2.082	2.73304	2.66512	6.1201	0.5101	0.69229	3.12648	0.9408	0.0718	0.03308	0.02516	0.03254	0.02985	0.0082	0.00993	0.018057	0.0223	0.1367	0.08985	0.15585	0.16687	0.15181	0.23	0.1844	0.196726	0.4114	1.074	1.217	0.511	2.826
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	**0.866**	**1.172**	**0.196**	**0.249**	**0.998**	**1.03**	**0.234**	**0.1**	**1.2902**	**0.57**	**0.0423**	**0.02688**	**0.02046**	**0.02726**	**0.02081**	0.0082	0.00993	0.015335	**0.0171**	**0.079**	**0.0454**	**0.08055**	**0.10344**	**0.10207**	**0.158**	**0.128**	**0.122266**	**0.1604**	**0.209**	**0.478**	**0.1341**	**0.622**

Sample Location		Yarmouth Road Area												Solar Field Area							Steamship Parking Lot Area			
Sample ID		HW-T (s)	HW-T (s)	HW-T (m)	HW-T (m)	RB-1 (s)	RB-1 (s)	RB-1 (s)	RB-1 (m)	RB-1 (m)	RB-1 (m)	RB-1 (m)	HW-D (m)	HW-D (m)	HW-D (d)	HW-D (d)	HW-D (dd)	HW-G(S)	HW-G(M)	HW-G(D)	HW-2	HW-2	HW-2	HW-2
Sample Date		10/1/2020	5/18/2022	10/1/2020	5/18/2022	11/5/2020	3/18/2021	9/5/2021	3/31/2022	11/5/2020	3/18/2021	9/5/2021	3/31/2022	4/7/2017	5/13/2020	6/24/2019	5/13/2020	6/24/2019	5/13/2020	12/3/2018	12/3/2018	12/3/2018	7/1/2016	5/5/2020	9/1/2021	3/25/2022
TOC Elevation	UCL	28.97	28.97	29.11	29.11	NA	NA	NA	NA	NA	NA	NA	NA	45.20	45.20	45.08	45.08	45.05	45.05	44.99	45.11	44.93	40.41	40.41	40.41	40.41
Depth to Groundwater		13.41	12.07	13.58	12.24	17.87	16.91	18.64	16.65	17.79	16.85	18.57	16.59	18.83	18.34	18.99	18.23	20.60	19.97	20.69	20.75	20.71	27.48	25.33	30.20	27.72
Groundwater Elevation		15.56	16.90	15.53	16.87	NA	NA	NA	NA	NA	NA	NA	NA	26.37	26.86	26.09	26.85	24.45	25.08	24.30	24.36	24.22	12.93	15.08	10.21	12.69
Total Well Depth		18.54	18.60	28.96	28.96	27.80	27.80	27.80	27.81	49.85	49.85	48.85	48.82	30.32	30.32	44.94	44.94	65.05	65.05	28.45	38.25	48.28	32.80	32.80	32.80	32.35
Perfluoroheptanoic acid (PFHpA)	100,000	0.0039	0.0073	0.022	0.02	0.0042	0.0054	0.0077	0.0051	0.011	0.013 J	0.0073	0.0073	0.0033 U	0.00053 U	0.021	0.017	<0.002	0.00053 U	0.0074 U	0.0074 U	0.0074 U	0.0071	0.035	0.046	0.011
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.17	0.029	0.019	0.046	0.0084	0.03	0.0051	0.022	0.01	0.017 J	0.0099	0.016	0.0089 J	0.00077 U	0.062	0.039	0.0092	0.008	0.0056 U	0.012 J	0.0056 U	0.0035	0.0066	0.0056 J	0.009
Perfluorononanoic acid (PFNA)	100,000	0.00074	0.0013	0.0032	0.00031 U	0.0047	0.0025	0.0026	0.0029	0.0068	0.0072 J	0.0044	0.0062	0.0046 U	0.00063 U	0.015	0.019	0.0041	0.0029	0.0087 U	0.011 J	0.0087 U	<0.002	0.016	0.004 J	0.0052
Perfluorooctanoic acid (PFOA)	100,000	0.0067	0.01	0.011	0.0035	0.007	0.0087	0.0093	0.0092	0.013	0.013 J	0.012	0.01	0.0046 U	0.00071 U	0.0088	0.0076	<0.002	0.00071 U	0.0033 U	0.0033 U	0.0033 U	0.0063	0.039	0.012	0.01
Perfluorooctane sulfonate (PFOS)	5,000	0.21	0.035	0.025	0.0059	0.038	0.04	0.01	0.0045	0.049	0.075	0.055	0.054	0.022	0.0011	0.095	0.12	0.013	0.013	0.0060 U	0.036	0.0060 U	0.012	0.053	0.026	0.024
Perfluorodecanoic Acid (PFDA)	100,000	0.00062 U	0.00047	0.0014	0.00054	0.00062 U	0.00038 U	0.00045 U	0.0019 U	0.00075	0.0038 U	0.0033	0.0028	0.0040 U	0.00062 U	<0.002	0.00062 U	<0.002	0.00062 U	0.0061 U	0.0061 U	0.0061 U	NA	0.00062 U	0.0025 U	0.0018 U
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	0.00039 U	0.00032 U	0.00039 U	0.00033 U	0.00039 U	0.0011 U	0.00034 U	0.0019 U	0.038	0.055	0.013	0.02	0.0032 U	0.00039 U	0.0022	0.00039 U	0.002 U	0.00039 U	0.0066 U	0.0066 U	0.0066 U	NA	0.15	0.071	0.052
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six																										
Total PFAS	NA	0.44114	0.1295	0.3254	0.33614	0.08008	0.1175	0.06755	0.0713	0.2015	0.2642	0.1561	0.1733	0.0309	0.0011	0.2768	0.24993	0.0263	0.02444	0.0087 U	0.059	0.0087 U	0.0289	0.42678	0.4136	0.1563
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	**0.39134**	**0.08307**	**0.0816**	**0.07594**	**0.0623**	**0.0866**	**0.0347**	**0.0437**	**0.09055**	**0.1252**	**0.0919**	**0.0963**	**0.0309**	0.0011	**0.2018**	**0.2026**	**0.0263**	**0.0239**	0.0087 U	**0.059**	0.0087 U	**0.0289**	**0.1496**	**0.0936**	**0.0592**

Sample Location		Maher Well Area																														
Sample ID		ME-1*	MW-1*	ME-1*	ME-1*	ME-1*	ME-1*	ME-2**	ME-2**	ME-2**	ME-2**	ME-2**	ME-2**	ME-3***	ME-3***	ME-3***	ME-3***	ME-3***	ME-3***	OW-18S	OW-18S	OW-18S	OW-18M	OW-18M	OW-18M	OW-18D	OW-18D Duplicate	OW-18D	OW-18D	OW-18D		
Sample Date		9/17/2020	7/29/2022	11/2/2022	2/2/2023	5/26/2023	12/6/2023	9/17/2020	7/29/2022	11/2/2022	2/2/2023	5/26/2023	12/6/2023	9/17/2020	7/29/2022	11/2/2022	2/2/2023	5/26/2023	12/6/2023	7/5/2016	12/7/2018	5/8/2020	7/5/2016	12/7/2018	5/8/2020	7/5/2016	7/5/2016	4/11/2017	12/7/2018	5/13/2020		
TOC Elevation	UCL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	39.03	39.03	39.03	39.30	39.30	39.30	38.84	38.84	38.84	38.84	38.84		
Depth to Groundwater		3.60	NA	NA	NA	NA	NA	6.50	NA	NA	NA	NA	NA	6.00	NA	NA	NA	NA	NA	24.40	24.29	23.45	25.82	24.72	23.93	25.95	25.95	25.55	24.28	23.47		
Groundwater Elevation		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14.63	14.74	15.58	13.48	14.58	15.37	12.89	12.89	13.29	14.56	15.37		
Total Well Depth		81.20	NA	NA	NA	NA	NA	54.20	NA	NA	NA	NA	NA	50.30	NA	NA	NA	NA	NA	31.23	31.23	31.23	74.44	74.44	74.44	123.36	123.36	123.36	123.36	123.36		
Perfluoroheptanoic acid (PFHpA)	100,000	0.011	0.025	0.017	0.015	0.018	0.015	0.0055	0.016	0.036	0.027	0.017	0.017	0.0036	0.0065	0.0082	0.0087	0.0086	0.012	0.0071	0.0074 U	0.0039	0.0029	0.0074 U	0.0074	0.0071	0.0063	0.015J	0.014 J	0.012		
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.03	0.058	0.04	0.027	0.029	0.038	0.04	0.035	0.071	0.065	0.044	0.046	0.018	0.029	0.032	0.032	0.034	0.038	0.0068	0.0056 U	0.0085	0.016	0.073	0.07	0.01	0.011	0.13	0.13	0.03		
Perfluorononanoic acid (PFNA)	100,000	0.017	0.021	0.015	0.0098	0.011	0.012	0.003	0.0089	0.023	0.014	0.0067	0.011	0.004	0.0054	0.007	0.0063	0.0061	0.0087	<0.002	0.0087 U	0.0032	0.0076	0.0087 U	0.0027	0.0065	0.0058	0.0046 U	0.0087 U	0.0028		
Perfluorooctanoic acid (PFOA)	100,000	0.016	0.029	0.021	0.015	0.018	0.019	0.0077	0.017	0.032	0.02	0.017	0.016	0.012	0.012	0.014	0.011	0.014	0.016	0.018	0.012 J	0.01	0.0058	0.0060 J	0.0096	0.0059	0.0059	0.025	0.019 J	0.0095		
Perfluorooctane sulfonate (PFOS)	5,000	0.11	0.12	0.087	0.069	0.069	0.075	0.095	0.051	0.093	0.077	0.065	0.07	0.072	0.07	0.086	0.072	0.083	0.094	0.0083	0.028	0.016	0.044	0.24	0.18	0.018	0.019	0.22	0.32	0.041		
Perfluorodecanoic Acid (PFDA)	100,000	0.00062 U	0.0017 U	0.001	0.0018 U	0.00083	0.00086 J	0.00062 U	0.0017 U	0.0014 J	0.00086 J	0.00079 U	0.00086 J	0.00062 U	0.0017 U	0.00064	0.0018 U	0.00074	0.00083 U	NA	0.0061 U	0.00062 U	NA	0.0061 U	0.00062 U	NA	NA	0.0040 U	0.0061 U	0.00062 U		
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	0.034	0.046	0.026	0.026	0.043	0.022	0.00039 U	0.043	0.25	0.31	0.045	0.07	0.0071	0.0054	0.0035	0.004	0.0027	0.014	NA	0.0066 U	0.00039 U	NA	0.0066 U	0.00039 U	NA	NA	0.0032 U	0.0066 U	0.00039 U		
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six																																
Total PFAS	NA	0.2873	0.4769	0.3426	0.2712	0.31403	0.15986	0.2009	0.2702	0.73928	0.70216	0.3223	0.35446	0.14005	0.1796	0.221	0.2012	0.21741	0.27988	0.0402	0.0573	0.05953	0.0763	0.3891	0.4357	0.0475	NA	0.506	0.5504	0.1832		
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	**0.184**	**0.253**	**0.181**	**0.1358**	**0.14583**	**0.15986**	**0.1512**	**0.1279**	**0.2564**	**0.20386**	**0.1497**	**0.16086**	**0.1096**	**0.1229**	**0.1478**	**0.13**	**0.1464**	**0.1687**	**0.0402**	**0.04**	**0.0416**	**0.0763**	**0.319**	**0.2697**	**0.0475**	**0.048**	**0.39**	**0.483**	**0.0953**		

Notes:

UCL – Upper Concentration Limit

< – Not detected by the laboratory above the reporting limit Reporting limit shown.

J – Estimated concentration between the method detection limit and reporting limit.

Results in ug/L, micrograms per liter

U– Not detected by the Laboratory above the method detection limit Method detection limit shown

Bold results above Method 1 GW-1 standard (0.02 ug/L).

Sum of six includes estimated values and does not include non-detects (U or <).

Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <)

NA – Not Applicable.

* – ME-1 is screened from 37 to 47 and 70 to 80 feet below grade.

** – ME-2 is screened from 44 to 54 feet below grade

*** – ME-3 is screened from 40 to 50 feet below grade.

The Method 1 GW-3 Standard for the individual analytes in the Sum of Six ranges from 500 to 40,000 ug/l

1 Well elevation increased due to soil cap

Table 3. Groundwater Results for PFAS Compounds ug/L

Sample Location		Airport Road/Iyannough Road Area														ARFF Building Area							
Sample ID		HW U(s)	HW U(s)	HW U(s)	HW-U(m)	HW U(m)	HW-U(m)	HW U(d)	HW-U(d)	HW U(d)	HW-V(m)	HW-L (s)	HW-L (m)	HW-L (d)	HW-L (d)	HW-P (s)	HW P (s)	HW P (s)	HW P (s)	HW P (s)	HW P (s)	HW P (s)	HW P (s)
Sample Date		4/19/2021	9/5/2021	3/15/2022	4/19/2021	9/5/2021	3/15/2022	10/2/2020	9/5/2021	3/15/2022	10/2/2020	10/7/2020	10/7/2020	6/19/2019	10/7/2020	10/1/2020	3/18/2021	9/8/2021	3/18/2022	11/2/2022	2/2/2023	6/8/2023	12/5/2023
TOC Elevation	UCL	NA	NA	NA	NA	NA	NA	48.80	48.80	48.80	53.83	39.07	38.98	39.15	39.15	40.51	40.51	40.51	40.51	40.51	40.51	40.51	40.51
Depth to Groundwater		23.59	24.53	22.89	23.50	24.49	22.80	24.66	25.24	23.52	22.90	21.96	21.88	19.40	22.22	22.69	22.09	23.54	21.61	23.96	21.42	22.23	23.47
Groundwater Elevation		NA	NA	NA	NA	NA	NA	24.14	23.56	25.28	30.93	17.11	17.10	19.75	16.93	17.82	18.42	16.97	18.90	16.55	19.09	18.28	17.04
Total Well Depth		28.83	28.83	29.15	38.93	38.93	39.65	62.30	62.30	63.65	36.15	27.33	37.33	70.55	70.55	27.60	27.60	27.60	27.61	27.61	27.62	27.60	27.60
Perfluoroheptanoic acid (PFHpA)	100,000	0.002 J	0.004	0.0027	0.0018 J	0.0049	0.004	0.01	0.01	0.01	0.0033	0.00053 U	0.0064	0.0078	0.0065	0.026	0.0067	0.004	0.01	0.0044	0.012	0.00698	0.0076
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.01	0.0034	0.0039	0.0043	0.011	0.0098	0.018	0.022	0.017	0.0032	0.0013	0.023	0.033	0.015	0.0018	0.00074 J	0.00056 J	0.0012 J	0.00054 U	0.0022	0.000798 JF	0.0018
Perfluorononanoic acid (PFNA)	100,000	0.0013 J	0.0017 J	0.0013 J	0.00083 J	0.0011 J	0.0021	0.0016	0.005	0.0025	0.0017	0.00063 U	0.0025	0.0033	0.0022	0.0061	0.002	0.0013 J	0.0039	0.0016 J	0.015	0.0151	0.013
Perfluorooctanoic acid (PFOA)	100,000	0.0075	0.0047	0.0052	0.0055	0.0094	0.018	0.01	0.013	0.013	0.0063	0.00071 U	0.01	0.025	0.018	0.0084	0.0042	0.0017 J	0.012	0.0037	0.014	0.0145	0.0034
Perfluorooctane sulfonate (PFOS)	5,000	0.06	0.029	0.012	0.0093	0.027	0.029	0.023	0.051	0.043	0.0059	0.0014	0.07	0.049	0.039	0.00097	0.00049 J	0.00054 U	0.00098 J	0.00048 J	0.0037	0.00138 JF	0.0024
Perfluorodecanoic Acid (PFDA)	100,000	0.00064 J	0.0011 J	0.0006 J	0.00038 U	0.001 U	0.00055 J	0.00062 U	0.0025 U	0.00047 J	0.00062 U	0.00062 U	0.00062 U	<0.002	0.0019	0.00085	0.0004 J	0.00048 U	0.00043 U	0.00066 U	0.0018 U	0.000464 J	0.00083 U
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	0.0011 U	0.00034 U	0.00032 U	0.0011 U	0.00075	0.00033 U	0.0012	0.04	0.00032 U	0.00039 U	0.00039 U	0.022	0.0021	0.00078	0.011	0.0034	0.0014	0.0083	0.0016 J	0.019	0.00441	0.0016 J
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six																							
Total PFAS	NA	0.09704	0.06596	0.04424	0.03622	0.0839	0.10395	0.0889	0.1775	0.12378	0.0543	0.0027	0.18375	0.1823	0.12348	0.2478	0.06294	0.05055	0.08508	0.03898	0.1232	0.100275	0.1088
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	**0.08144**	**0.0439**	**0.0257**	**0.02173**	**0.0534**	**0.06345**	**0.0588**	**0.0987**	**0.08167**	**0.0204**	0.0027	**0.1119**	**0.1181**	**0.0826**	**0.04412**	0.01453	0.00756	**0.02808**	**0.01018**	**0.0469**	**0.039222**	**0.0282**

Sample Location		Deployment Area																					
Sample ID		HW-E	HW E	HW-E	HW-E	HW E[1]	HW E[1]	HW E[1]	HW-F	HW F	HW-F	HW-F	HW-F	HW-F	HW-H	HW H	HW H	HW H[†]	HW-R(s)	HW-R(s)	HW R(s)	HW-R(s)	HW R[†]
Sample Date		4/5/2017	11/7/2018	8/19/2019	5/5/2020	3/17/2021	9/8/2021	3/16/2022	4/5/2017	11/7/2018	5/5/2020	3/17/2021	9/8/2021	3/16/2022	11/7/2018	5/8/2020	5/18/2022	6/1/2023	10/1/2020	3/17/2021	9/8/2021	3/16/2022	6/1/2023
TOC Elevation	UCL	38.45	38.45	38.45	38.45	42.40	42.40	42.40	36.32	36.32	36.32	36.32	36.32	36.32	38.47	38.47	38.47	NA	35.72	35.72	35.72	35.72	NA
Depth to Groundwater		19.05	19.38	17.82	16.16	23.35	25.02	22.67	19.60	20.08	16.82	20.01	21.72	19.34	20.39	17.37	20.07	23.10	18.33	17.37	19.00	16.69	18.44
Groundwater Elevation		19.40	19.07	20.63	22.29	19.05	17.38	19.73	16.72	16.24	19.50	16.31	14.60	16.98	18.08	21.10	18.40	NA	17.39	18.35	16.72	19.03	NA
Total Well Depth		26.22	26.22	26.22	26.22	30.26	30.26	30.26	26.89	26.89	26.89	26.89	26.89	26.83	27.09	27.09	27.07	28.03	23.56	23.67	23.67	23.66	23.25
Perfluoroheptanoic acid (PFHpA)	100,000	0.15	0.0074 U	0.0053	0.044	0.014	0.0018 J	0.023	0.34	0.0074 U	0.23	0.39	0.0051	0.36	0.077	0.28	0.015	0.00076 U	0.021	0.005	0.021	0.03	0.0099
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.042	0.0056 U	0.0021	0.011	0.0015 J	0.00088 J	0.0028	0.019J	0.0056 U	0.005	0.012 U	0.00037 U	0.0097	0.0056 U	0.0031	0.0021	0.00099 J	0.02	0.01	0.0046	0.0019	0.0012 J
Perfluorononanoic acid (PFNA)	100,000	0.0087 J	0.0087 U	<0.002	0.0052	0.00048 U	0.00037 U	0.0023	0.0046 U	0.0087 U	0.00081	0.0097 U	0.00037 U	0.0025	0.0087 U	0.00063 U	0.0003 U	0.00083 U	0.0031	0.001 J	0.00034 U	0.00031 U	0.00081 U
Perfluorooctanoic acid (PFOA)	100,000	0.053	0.0033 U	0.0047	0.027	0.00095 J	0.00094 J	0.029 J	0.075	0.0033 U	0.02	0.052	0.00074 U	0.052	0.0050 J	0.002	0.0006 U	0.0012 U	0.014	0.004	0.004	0.0014 J	0.0012 U
Perfluorooctane sulfonate (PFOS)	5,000	0.047	0.0060 U	<0.002	0.0037	0.00082 J	0.00064 U	0.0013 J	0.0026 U	0.0060 U	0.00086	0.0076 U	0.00065 U	0.0037	0.0060 U	0.00068 U	0.00053 U	0.00077 U	0.016	0.0023	0.0053	0.001 J	0.00074 U
Perfluorodecanoic Acid (PFDA)	100,000	0.0040 U	0.0061 U	<0.002	0.00062 U	0.00038 U	0.00052 U	0.00043 U	0.0040 U	0.0061 U	0.00062 U	0.0076 U	0.00053 U	0.00043 U	0.0061 U	0.00062 U	0.00043 U	0.00075 U	0.00062 U	0.00038 U	0.00049 U	0.00044 U	0.00073 U
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	2	0.0066 U	0.069	0.86	0.0035	0.00039 U	0.83	5.7	0.0066 U	1.5	4.8	0.0049	8.2	1.5	0.13	0.00032 U	0.0011 U	0.037	0.0048	0.003	0.0053	0.0011 U
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six																							
Total PFAS	NA	3.2257	0.0087 U	0.14	1.04526	0.04812	0.01342	0.9169	12.96	0.084	2.65637	8.422	0.159	12.18373	4.452	1.26666	0.165	0.021	0.2171	0.04878	0.2549	0.30126	0.0873
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	**0.3007**	0.0087 U	0.0121	**0.0909**	0.01727	0.00362	**0.0584**	**0.434**	0.0087 U	**0.25667**	**0.442**	0.0051	**0.4279**	**0.082**	**0.2851**	0.0171	0.00099	**0.0741**	**0.0223**	**0.0349**	**0.0343**	**0.0111**

Sample Location		Steamship Parking Lot Area																			
Sample ID		HW-3	HW-3	HW-3	HW-3	HW-3	HW-3	HW-3	HW-3	HW-3	HW 300	HW-300	HW-300	HW-300	HW-301	HW-302	HW 302	HW-302	HW 302	HW-302	HW-302
Sample Date		7/1/2016	4/5/2017	10/26/2018	5/5/2020	3/17/2021	9/1/2021	3/25/2022	10/31/2022	12/6/2023	7/1/2016	3/17/2021	9/2/2021	3/31/2022	7/1/2016	7/1/2016	12/3/2018	3/17/2021	9/1/2021	3/25/2022	12/6/2023
TOC Elevation	UCL	38.74	38.74	38.74	38.74	38.74	38.74	38.74	38.74	38.74	36.09	36.09	36.09	36.09	39.46	41.17	41.17	41.17	41.17	41.17	41.17
Depth to Groundwater		25.81	25.70	26.06	23.64	26.19	28.35	26.03	27.63	27.43	22.52	22.86	23.02	22.53	25.05	23.52	22.65	24.04	26.15	23.70	25.59
Groundwater Elevation		12.93	13.04	12.68	15.10	12.55	10.39	12.71	11.11	11.31	13.57	13.23	13.07	13.56	14.41	17.65	18.52	17.13	15.02	17.47	15.58
Total Well Depth		33.08	33.08	33.08	33.08	33.12	33.11	33.70	33.00	32.99	30.33	30.30	30.34	30.40	30.42	30.45	30.45	30.44	30.40	30.42	30.40
Perfluoroheptanoic acid (PFHpA)	100,000	0.016	0.1	0.10	0.1	0.084	0.035	0.02	0.054	0.018	0.0096	0.0028	0.0029	0.0019 U	0.002	0.019	0.015 J	0.0066	0.0062	0.0092	0.012
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.0043	0.020 J	0.012 J	0.0087	0.0064 J	0.0057 J	0.013	0.024	0.03	0.012	0.0099	0.00066 J	0.006	0.038	0.0063	0.016 J	0.0022	0.004	0.013	0.0084
Perfluorononanoic acid (PFNA)	100,000	0.0063	0.027	0.023	0.021	0.019 J	0.014 J	0.0039	0.0097	0.0092	<0.002	0.00099 J	0.0028	0.0019 U	<0.002	0.054	0.0097 J	0.0066	0.005	0.02	0.033
Perfluorooctanoic acid (PFOA)	100,000	0.0091	0.065	0.057	0.054	0.064	0.016 J	0.0069	0.022	0.015	0.0052	0.0044	0.0044	0.0033	0.0037	0.033	0.03	0.005	0.0065	0.017	0.011
Perfluorooctane sulfonate (PFOS)	5,000	0.084	0.15	0.053	0.1	0.056	0.044	0.024	0.028	0.044	0.017	0.015	0.017	0.012	0.011	0.014	0.031	0.0041	0.015	0.0095	0.021
Perfluorodecanoic Acid (PFDA)	100,000	NA	0.0040 U	0.0061 U	0.0014	0.0038 U	0.0052 U	0.0019 U	0.00069 U	0.00079 U	NA	0.00038 U	0.0006 J	0.0019 U	NA	NA	0.0061 U	0.00086 J	0.001 J	0.0019 U	0.0016
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	NA	0.47	0.12	0.13	0.47	0.2	0.14	0.0014 U	0.13	NA	0.0011 U	0.00034 U	0.0019 U	NA	NA	0.13	0.012	0.0062	0.072	0.026
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six																					
Total PFAS	NA	0.1197	1.603	0.952	0.96981	1.1394	0.6867	0.4359	0.73178	0.4776	0.0438	0.05509	0.03812	0.0369	0.0547	0.1263	0.3427	0.08304	0.09793	0.2149	0.20946
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	**0.1197**	**0.362**	**0.245**	**0.2851**	**0.2294**	**0.1147**	**0.0678**	**0.1377**	**0.1162**	**0.0438**	**0.03309**	**0.02836**	**0.0213**	**0.0547**	**0.1263**	**0.1017**	**0.02536**	**0.0377**	**0.0687**	**0.087**

Sample Location		Maher Well Area																			
Sample ID		OW-19(S)	OW-19(S)	OW-19(S)	OW-19(S)	OW-19(M)	OW-19(M)	OW-19(M)	OW-19(M)	OW-19D	OW-19D	OW-19D	OW-19D	OW-19D	HW-W(m)	HW-W(m)	HW-W(m)	HW-W(m)	HW-W(d)	HW-W(d)	HW-W(d)
Sample Date		11/6/2020	3/18/2021	9/2/2021	3/16/2022	11/6/2020	3/19/2021	9/3/2021	3/18/2022	4/11/2017	5/13/2020	3/19/2021	9/11/2021	3/18/2022	4/19/2021	9/5/2021	3/16/2022	10/31/2022	4/19/2021	9/5/2021	3/16/2022
TOC Elevation	UCL	NA	NA	NA	NA	NA	NA	NA	NA	39.06	39.06	39.06	39.06	39.06	NA	NA	NA	NA	NA	NA	NA
Depth to Groundwater		27.38	26.27	28.47	27.42	27.57	27.15	28.65	27.59	26.73	25.64	27.52	28.90	27.95	28.96	30.17	29.12	29.59	28.73	29.93	28.92
Groundwater Elevation		NA	NA	NA	NA	NA	NA	NA	NA	12.33	13.42	11.54	10.16	11.11	NA	NA	NA	NA	NA	NA	NA
Total Well Depth		34.56	34.65	34.67	35.20	76.28	76.24	76.25	78.05	110.42	110.42	110.33	110.34	112.70	52.04	58.02	53.10	52.09	61.78	61.78	63.02
Perfluoroheptanoic acid (PFHpA)	100,000	0.0042	0.0044	0.0056	0.0062	0.03	0.044	0.014	0.0038	0.0051 J	0.011	0.018	0.022	0.018	0.01	0.0034	0.0041	0.013	0.0021	0.01	0.01
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.0031	0.0064	0.0027	0.0044	0.027	0.014 J	0.015	0.013	0.029	0.12	0.026	0.028	0.029	0.012	0.015	0.014	0.025	0.0088	0.0064	0.022
Perfluorononanoic acid (PFNA)	100,000	0.0024	0.0012 J	0.0025	0.0012 J	0.002	0.0048 U	0.0021	0.0022	0.006 J	0.0017	0.0029	0.00088 J	0.00042 J	0.00077 J	0.001 J	0.00055 J	0.002	0.0013 J	0.0025	0.0023
Perfluorooctanoic acid (PFOA)	100,000	0.011	0.007	0.0066	0.0085	0.011	0.0094 J	0.0037	0.0045	0.0046 U	0.023	0.0097	0.007	0.0078	0.0041	0.0024	0.0032	0.0071	0.0029	0.0094	0.0097
Perfluorooctane sulfonate (PFOS)	5,000	0.025	0.015	0.031	0.0071	0.047	0.027	0.029	0.012	0.029	0.31	0.047	0.053	0.041	0.075	0.042	0.068	0.13	0.012	0.017	0.034
Perfluorodecanoic Acid (PFDA)	100,000	0.0027	0.001 J	0.00048 U	0.00046 U	0.00062 U	0.0038 U	0.00046 U	0.00043 U	0.0040 U	0.00062 U	0.00038 U	0.00048 U	0.00046 U	0.00038 U	0.00046 U	0.00044 U	0.00063 U	0.00038 U	0.00046 U	0.00043 U
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	0.00039 U	0.0011 U	0.00036 U	0.00034 U	0.00095	0.011 U	0.00035 U	0.00032 U	0.0032 U	0.00039 U	0.0011 U	0.00036 U	0.00034 U	0.0011 U	0.0029	0.0034	0.0072	0.0011 U	0.00042	0.00059
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six																					
Total PFAS	NA	0.0707	0.0634	0.07307	0.05705	0.37335	0.3974	0.16133	0.0571	0.0936	0.5463	0.3127	0.31489	0.28111	0.17849	0.17264	0.20725	0.3989	0.04339	0.08666	0.13162
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	**0.0484**	**0.035**	**0.0484**	**0.0274**	**0.117**	**0.0944**	**0.0638**	**0.0355**	**0.0691**	**0.4657**	**0.1036**	**0.11088**	**0.09622**	**0.09707**	**0.06380**	**0.08985**	**0.1771**	**0.0271**	**0.0453**	**0.078**

Notes:

UCL – Upper Concentration Limit

< – Not detected by the laboratory above the reporting limit Reporting limit shown.

J – Estimated concentration between the method detection limit and reporting limit.

Results in ug/L, micrograms per liter.

U– Not detected by the Laboratory above the method detection limit Method detection limit shown

Bold results above Method 1 GW-1 standard (0.02 ug/L).

Sum of six includes estimated values and does not include non-detects (U or <).

Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <)

NA – Not Applicable.

The Method 1 GW-3 Standard for the individual analytes in the Sum of Six ranges from 500 to 40,000 ug/l

1 Well elevation increased due to soil cap.

Table 3. Groundwater Results for PFAS Compounds ug/L

Sample Location		ARFF Building Area									
Sample ID	UCL	HW P (m)	HW P (m)	HW P (m)	HW-P (m)	HW-P (m)	HW P (m)	HW-P (m)	HW Q (s)	HW Q (s)	HW Q (m)
Sample Date		10/1/2020	3/18/2021	9/8/2021	3/18/2022	11/2/2022	6/8/2023	12/5/2023	10/1/2020	11/6/2020	10/1/2020
TOC Elevation		40.64	40.64	40.64	40.64	40.64	40.64	40.64	37.89	37.89	37.90
Depth to Groundwater		22.80	22.20	23.67	21.73	24.08	22.39	23.55	21.45	22.04	21.41
Groundwater Elevation		17.84	18.44	16.97	18.91	16.56	18.25	17.09	16.44	15.85	16.49
Total Well Depth		38.30	38.30	38.30	38.28	38.30	30.25	38.26	26.60	26.60	36.79
Perfluoroheptanoic acid (PFHpA)	100,000	0.003	0.017	0.016	0.009	0.0083	0.00451	0.0052	0.0018 J	0.0021	0.00053 U
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.00085	0.0015 J	0.0013 J	0.002	0.0011 J	0.0034	0.021	0.013	0.0087	0.0019
Perfluorononanoic acid (PFNA)	100,000	0.0011	0.006	0.0099	0.009	0.0095	0.00746	0.0073	0.00063 U	0.00063 U	0.00075
Perfluorooctanoic acid (PFOA)	100,000	0.0018	0.0096	0.01	0.0081	0.008	0.00378	0.0055	0.0049	0.0062	0.00095
Perfluorooctane sulfonate (PFOS)	5,000	0.0011	0.0035	0.003	0.0026	0.0022	0.00275	0.04	0.0041	0.0075	0.0049
Perfluorodecanoic Acid (PFDA)	100,000	0.00062 U	0.00038 U	0.00048 U	0.00043 U	0.00065 U	0.00174 U	0.00078 U	0.00062 U	0.00062 U	0.00062 U
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	0.00092	0.0011 U	0.00036 U	0.00033 U	0.0013 U	0.00174 U	0.0011 U	0.00039 U	0.00039 U	0.00039 U
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six											
Total PFAS	NA	0.02967	0.17311	0.15362	0.08697	0.0705	0.051382	0.1076	0.0307	0.0346	0.00944
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	0.00785	**0.0376**	**0.0402**	**0.0307**	**0.0291**	**0.0219**	**0.079**	**0.0238**	**0.0245**	0.0085

Sample Location		Yarmouth Road Area													
Sample ID	UCL	HW S (s)	HW S (s)	HW S (s)	HW-S (s)	HW S(s)	HW S(s)	HW-S(s)	HW S (m)	HW S (m)	HW S (m)	HW S (m)	HW-S(m)	HW S(m)	HW S(m)
Sample Date		10/1/2020	3/18/2021	9/3/2021	3/31/2022	8/8/2022	6/9/2023	12/6/2023	10/1/2020	3/18/2021	9/3/2021	3/25/2022	8/8/2022	6/9/2023	12/6/2023
TOC Elevation		31.60	31.60	31.60	31.60	31.60	31.60	31.60	31.59	31.59	31.59	31.59	31.59	31.59	31.59
Depth to Groundwater		16.88	16.29	17.30	15.70	16.43	17.59	17.59	17.01	16.35	17.37	15.48	17.94	16.76	17.70
Groundwater Elevation		14.72	15.31	14.30	15.90	15.17	14.01	14.01	14.58	15.24	14.22	16.11	13.65	14.83	13.89
Total Well Depth		22.10	22.10	22.10	22.20	22.15	22.05	22.05	32.04	32.04	32.04	32.05	32.11	32.10	32.11
Perfluoroheptanoic acid (PFHpA)	100,000	0.11	0.14	0.11	0.061	0.16	0.0467	0.09	0.00096	0.0011 J	0.0012 J	0.0018 U	0.0065	0.0257	0.0013 J
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.055	0.083	0.064	0.041	0.12	0.03	0.067	0.0064	0.0073	0.0053	0.0026	0.0074	0.0216	0.005
Perfluorononanoic acid (PFNA)	100,000	0.1	0.024	0.1	0.043	0.16	0.0442	0.18	0.00063 U	0.00057 J	0.00055 J	0.0018 U	0.0017 U	0.0262	0.0019
Perfluorooctanoic acid (PFOA)	100,000	0.062	0.078	0.13	0.05	0.23	0.0521	0.12	0.0013	0.0018 J	0.0014 J	0.0019	0.0049	0.0297	0.0014 J
Perfluorooctane sulfonate (PFOS)	5,000	0.1	0.03	0.048	0.048	0.16	0.185	0.15	0.0058	0.006	0.0094	0.0052	0.0096	0.255	0.017
Perfluorodecanoic Acid (PFDA)	100,000	0.00062 U	0.0038 U	0.012 U	0.0019 U	0.0017 U	0.01 U	0.00082	0.00062 U	0.00038 U	0.00047 U	0.0018 U	0.0017 U	0.00177 U	0.00077
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	3.7	3.1	5.2	0.0019 U	0.0017 U	1.15	2.4	0.0065	0.0067	0.0036	0.023	0.0017 U	0.198	0.011
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six															
Total PFAS	NA	4.8958	4.3105	6.1418	0.5956	1.5581	1.7573	3.4027	0.02471	0.03263	0.02873	0.043	0.0564	0.635542	0.0464
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	**0.427**	**0.355**	**0.452**	**0.243**	**0.83**	**0.358**	0.607	0.01446	0.01677	0.01785	0.0097	**0.0284**	**0.3582**	**0.02737**

Sample Location		Steamship Parking Lot Area				
Sample ID	UCL	HW-K	HW-K	HW-K	HW-K	HW-K
Sample Date		6/19/2019	5/21/2020	3/18/2021	9/2/2021	3/25/2022
TOC Elevation		37.70	37.70	37.70	37.70	37.70
Depth to Groundwater		20.88	20.56	22.87	24.24	22.93
Groundwater Elevation		16.82	17.14	14.83	13.46	14.77
Total Well Depth		44.18	44.18	44.17	44.18	44.17
Perfluoroheptanoic acid (PFHpA)	100,000	0.0051	0.0028	0.0044	0.0086	0.017
Perfluorohexanesulfonic acid (PFHxS)	5,000	<0.002	0.001	0.00066 J	0.0015 J	0.0019
Perfluorononanoic acid (PFNA)	100,000	<0.002	0.0012	0.0037	0.003	0.0087
Perfluorooctanoic acid (PFOA)	100,000	0.0041	0.0019	0.0036	0.0038	0.012
Perfluorooctane sulfonate (PFOS)	5,000	<0.002	0.0016	0.0015 J	0.0019	0.0037
Perfluorodecanoic Acid (PFDA)	100,000	<0.002	0.00062 U	0.00038 U	0.00046 U	0.0019 U
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	<0.002	0.00039 U	0.0011 U	0.00034 U	0.0019 U
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six						
Total PFAS	NA	0.0348	0.0275	0.04486	0.09217	0.1864
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	0.0092	0.0085	0.01386	0.0188	**0.0433**

Sample Location		Maher Well Area													
Sample ID	UCL	HW-W(dd)	HW-W(dd)	HW-W(dd)	OW-9S	OW-9S	OW-9S	OW-9M	OW-9M	OW-9D	OW-9D	OW-9D	OW-9DD	OW-9DD	OW-9DD
Sample Date		4/19/2021	9/5/2021	3/16/2022	7/5/2016	12/3/2018	5/8/2020	12/3/2018	5/8/2020	7/5/2016	12/3/2018	5/5/2020	4/11/2017	12/3/2018	10/2/2020
TOC Elevation		NA	NA	NA	23.25	23.25	23.25	23.53	23.53	23.22	23.22	23.22	23.81	23.81	23.81
Depth to Groundwater		28.67	29.89	28.85	12.23	10.80	10.14	11.11	10.45	12.48	10.82	10.15	12.10	11.30	13.04
Groundwater Elevation		NA	NA	NA	11.02	12.45	13.11	12.42	13.08	10.74	12.40	13.07	11.71	12.51	10.77
Total Well Depth		72.10	72.09	73.61	21.35	21.35	21.35	56.20	56.20	68.63	68.63	68.63	86.75	86.75	86.75
Perfluoroheptanoic acid (PFHpA)	100,000	0.0091	0.0073	0.0077	0.014	0.048	0.0064	0.11	0.0061	0.0028	0.033	0.044	0.034	0.015 J	0.0085
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.0086	0.0048	0.02	<0.003	0.023	0.011	0.0056 U	0.0033	0.012	0.12	0.18	0.12	0.042	0.019
Perfluorononanoic acid (PFNA)	100,000	0.0014 J	0.002	0.0015 J	0.0077	0.0087 U	0.0033	0.044	0.0037	0.0036	0.1	0.15	0.059	0.038	0.018
Perfluorooctanoic acid (PFOA)	100,000	0.0046	0.0069	0.0059	0.007	0.032	0.0043	0.052	0.0035	0.0052	0.057	0.088	0.055	0.020 J	0.01
Perfluorooctane sulfonate (PFOS)	5,000	0.015	0.0081	0.035	0.0074	0.024	0.0058	0.0081 J	0.01	0.041	0.52	0.72	0.5	0.14	0.049
Perfluorodecanoic Acid (PFDA)	100,000	0.00038 U	0.00049 U	0.00045 U	NA	0.0061 U	0.00062 U	0.0061 U	0.00062 U	NA	0.0061 U	0.00062 U	0.0040 U	0.0061 U	0.00062 U
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	0.0011 U	0.00036 U	0.0033 U	NA	0.0066 U	0.00039 U	0.64	0.0049	NA	0.19	0.23	0.13	0.062	0.02
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six															
Total PFAS	NA	0.10469	0.0563	0.11378	0.0361	0.618	0.06678	1.7141	0.0816	0.0646	1.217	1.5845	1.02	0.39	0.169
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	**0.0387**	**0.0291**	**0.0701**	**0.0361**	**0.127**	**0.0308**	**0.2141**	**0.0266**	**0.0646**	**0.83**	**1.182**	**0.768**	**0.255**	**0.1045**

Notes:

UCL – Upper Concentration Limit

< – Not detected by the laboratory above the reporting limit Reporting limit shown.

J – Estimated concentration between the method detection limit and reporting limit.

Results in ug/L, micrograms per liter.

U– Not detected by the Laboratory above the method detection limit Method detection limit shown

Bold results above Method 1 GW-1 standard (0.02 ug/L).

Sum of six includes estimated values and does not include non-detects (U or <).

Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <)

NA – Not Applicable.

Table 4 - 1,4 Dioxane Groundwater Results ug/L

Sample Location	North Ramp																	Airport Road/Iyannough Road Area							ARFF Building			
Sample ID	HW-1	HW-1	HW-5	HW-12	OW-6	OW-6	HW-4M	HW-4D	HW-204	HW-29	HW-207S	HW-207D	HW-207D	HW-19D	HW-19D	HW-X(s)	HW-X(m)	HW-A(D)	HW-A(D)	HW-B(D)	HW-N	HW-O	HW-U(d)	HW-V(m)	HW-L(s)	HW-L(m)	HW-L(d)	HW-L(d)
Sample Date	5/7/2015	8/5/2019	5/7/2015	5/7/2015	5/7/2015	9/27/2019	4/5/2017	4/5/2017	9/27/2019	9/27/2019	9/27/2019	4/5/2017	9/27/2019	4/5/2017	9/27/2019	9/10/2021	9/10/2021	4/5/2017	8/5/2019	4/5/2017	8/5/2019	8/5/2019	10/2/2020	10/2/2020	10/7/2020	10/7/2020	7/2/2019	5/13/2020
1,4-Dioxane	<0.152	<0.25	<0.150	<0.150	<0.150	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.19	<0.22	<0.25	<0.25	<0.25	<0.25	<0.25	**0.73**	**0.8**	<0.2	<0.2	**0.727**	**0.75**
Sample Location	**Maher Well Field**															**Deployment Area**												
Sample ID	OW-9M	OW-9D	OW-9D	OW-9D	OW-9DD	OW-9DD	OW-9DD	OW-18M	OW-18D	OW-18D	OW-18D	OW-19M	OW-19D	OW-19D	OW-19D	HW-E	HW-J											
Sample Date	5/28/2015	5/28/2015	12/3/2018	5/5/2020	5/28/2015	4/11/2017	12/3/2018	4/11/2017	4/11/2017	12/7/2018	5/13/2020	4/11/2017	4/11/2017	12/7/2018	5/13/2020	9/10/2021	9/10/2021											
1,4-Dioxane	<0.141	<0.141	<0.25	<0.19	**0.926**	**0.838**	**0.732**	<0.25	**0.552**	<0.25	**0.35**	<0.25	**0.800**	<0.25	**0.3**	<0.20	<0.20											

Notes:
Results in ug/L, micrograms per liter.
< = Not detected by the laboratory above the reporting limit. Reporting limit shown.
Bold results above Method 1 GW-1 standard (0.3 ug/L).
The Method 1 GW-2 standard for 1,4-dioxane is 6,000 ug/l.
The Method 1 GW-3 standard for 1,4-dioxane is 50,000 ug/l.

Table 5. ARFF Concentrate Analytical Results ug/L

Sample ID	Foam Mix
Sample Date	12/9/2016
Perfluoroheptanoic acid (PFHpA)	3.4 J
Perfluorohexanesulfonic acid (PFHxS)	2.1 J
Perfluorononanoic acid (PFNA)	93
Perfluorooctanoic acid (PFOA)	19
Perfluorooctane sulfonate (PFOS)	5 U
Perfluorodecanoic Acid (PFDA)	2.8 J
6:2 FTS	33
Total PFAS	222.5
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	120.3

Notes:

1. U = Not detected by the laboratory above the Method Detection Limit. Method Detection Limit shown.
2. Results in ug/L, micrograms per liter.
3. Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U).
4. Sample is AFFF concentrate.
5. J = Estimated concentration between the Method Detection Limit and the Laboratory Reporting Limit.

Table 6. SPLP Results ug/L

Sample ID	DL4 4'	DL5 2'	DL8 (4')	DL14(0-1')	Stockpile West	Stockpile East	ARFF Rubber Roof	ARFF Asphalt Roof
Sample Date	9/26/2017	9/26/2017	9/26/2017	9/26/2017	10/10/2017	10/10/2017	11/17/2020	11/17/2020
Perfluoroheptanoic acid (PFHpA)	0.011 U	0.011 U	0.065 J	0.17	0.011 U	0.011 U	0.00279	0.0002 U
Perfluorohexanesulfonic acid (PFHxS)	0.0072 U	0.0072 U	0.036 U	0.01 J	0.0072 U	0.0072 U	0.00034 U	0.00036 U
Perfluorononanoic acid (PFNA)	0.16	0.0032 U	0.052 J	0.37	0.0032 U	0.0032 U	0.00068 J	0.00028 U
Perfluorooctanoic acid (PFOA)	0.012 J	0.042	0.6	0.87	0.0037 U	0.0037 U	0.0073	0.00021 U
Perfluorooctane sulfonate (PFOS)	0.013 J	0.0072 U	0.036 U	0.19	0.0072 U	0.0072 U	0.00045 U	0.00202
Perfluorodecanoic Acid (PFDA)	0.0052 U	0.0052 U	0.026 U	0.34	0.0052 U	0.0052 U	0.000364 J	0.000271 U
6:2 FTS	0.067	0.0072 U	25	7.13	0.034 J	0.024 J	0.0154 J	0.0017 J
Total PFAS	0.195	0.042	26.25	20.195	0.034	0.024	0.072723	0.07957
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	0.185	0.042	0.717	1.95	0.011 U	0.011 U	0.011133	0.00202

Notes:

1. U = Not detected by the laboratory above the Method Detection Limit. Method Detection Limit shown.
2. Results in ug/L, micrograms per liter.
3. Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U).

Table 7: Background PFAS Levels in Soil and Soil Stockpile Samples

						Background Sample Locations																			
Sample ID	Method 1 Standard		Stockpile West	Stockpile East	Loam Pile	BG-1 0-1'	BG-2 0-1'	BG-3 0-1'	BG-4 0-1'	BG-5 0-1'	BG-6 0-1'	BG-7 0-1'	BG-8 0-1'	BG-9 0-1'	BG-10 0-1'	BG-11 0-1'	BG-12 0-1'	BG-13 0-1'	BG-14 0-1'	BG-15 0-1'	BG-16 0-1'	BG-17 0-1'	BG-18 0-1'	BG-19 0-1'	BG-20 0-1'
Sample Date	S-1/GW-1	S-1/GW-3	10/10/2017	10/10/2017	10/10/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017
Sample Location			On-Airport	On-Airport	On-Airport	Off-Airport	On-Airport	On-Airport	On-Airport	On-Airport	On-Airport	On-Airport	On-Airport	Off-Airport	Off-Airport	Off-Airport	Off-Airport	Off-Airport	Off-Airport	Off-Airport	Off-Airport	Off-Airport	Off-Airport	Off-Airport	Off-Airport
Perfluoroheptanoic acid (PFHpA)	0.5	300	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.18 J	0.17 U	0.18 J	0.17 U	0.17 U	0.23 J	0.17 U	0.17 U	0.19 U	0.19 U	0.19 U	0.19 U	0.44 J	0.19 U	0.19 U	0.35 J	0.19 U	0.46 J
Perfluorohexanesulfonic acid (PFHxS)	0.3	300	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.24 U	**0.39 J**	0.24 U	0.24 U	**0.57 J**	**0.47 J**	0.24 U	**0.49 J**	0.24 U	0.24 U
Perfluorooctanoic acid (PFOA)	0.72	300	0.26 U	0.26 U	0.26 U	0.58 J	0.26 U	0.26 U	0.16 U	0.47 J	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	**0.75 J**	0.67 J	0.33 J	0.25 U	0.46 J	0.37 J	0.36 J	0.5 J	0.25 U	**0.86 J**
Perfluorononanoic acid (PFNA)	0.32	300	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.22 U	0.29 J	0.22 U	0.22 U	**0.53 J**	0.22	**0.67 J**	**0.41 J**	0.22 U	0.22 U
Perfluorooctane sulfonate (PFOS)	2	300	0.38 J	0.39 J	0.81 J	0.21 U	0.7 J	0.38 J	**2.3**	0.41 J	0.32 J	0.33 J	0.31 J	1.3	0.62 J	0.41 J	0.76 J	0.99	0.26 U	**3.1**	2	0.36 J	**2.3**	0.41 J	0.44 J
Perfluorodecanoic Acid (PFDA)	0.3	300	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.28 U	0.28 U	**0.36 J**	0.28 U	**0.31 J**	**0.41 J**	0.28 U	**0.41 J**	0.28 U	0.28 U
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six																									
Total PFAS	NA	NA	1.78	0.91	0.81	1.47	0.7	0.56	3.21	1.31	0.32	0.3	0.84	1.3	0.62	1.16	2.73	1.68	0	6.79	3.77	5.09	5.45	0.41	2.43
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	NA	0.38	0.39	0.81	0.58	0.7	0.56	2.3	1.06	0.32	0.33	0.54	1.3	0.62	1.16	2.11	1.68	0	5.41	3.47	1.39	4.46	0.41	1.76

Notes:
J = Estimated concentration between the method detection limit and reporting limit.
Results in ug/kg, micrograms per kilogram.
U= Not detected by the Laboratory above the method detection limit. Method detection limit shown.
Bold results above the proposed Method 1 S-1/GW-1 standard.
Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <).
Sum of six includes estimated values and does not include non-detects (U or <).

Table 8. Surface Water Results for PFAS ug/L

	Surface Water		
Sample ID	Kmart	LP-1	UGP-1
Sample Date	6/20/2017	7/11/19	7/11/19
Perfluoroheptanoic acid (PFHpA)	0.0033 U	<0.01	<0.02
Perfluorohexanesulfonic acid (PFHxS)	0.0034 U	<0.01	<0.02
Perfluorononanoic acid (PFNA)	0.0043 J	<0.01	<0.02
Perfluorooctanoic acid (PFOA)	0.0026 U	<0.01	<0.02
Perfluorooctane sulfonate (PFOS)	0.0046 U	<0.01	<0.02
Perfluorodecanoic Acid (PFDA)	0.0040 U	<0.01	<0.02
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six			
Total PFAS	0.0174	0.018	0.047
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	0.0043	<0.01	<0.02

Notes:

< = Not detected by the laboratory above the reporting limit. Reporting limit shown.

J = Estimated concentration between the method detection limit and reporting limit.

Results in ug/L, micrograms per liter.

U= Not detected by the laboratory above the method detection limit. Method detection limit shown.

Sum of six includes estimated values and does not include non-detects (U or <).

Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <).

Currently MassDEP has not issued a surface water standard for PFAS.

The Method 1 GW-1 Standard for the Sum of Six is 0.02 ug/l.

The Method 1 GW-3 Standard for the individual analytes in the Sum of Six range from 500 to 40,000 ug/l.

Table 9: Ratio of Stable Isotopes Oxygen-18 and Hydrogen-2 Laboratory Results

Sample Date	Lab Sample ID	HW Sample ID	Stable Isotope Oxygen-18			Stable Isotope Hydrogen-2		
			δ18O (V-SMOW)	Atm %	Expected Values	δ18O (V-SMOW)	Atm %	Expected Values
11/7/2018	1811299-2	HW-I	-6.92	0.20	-	-40.41	0.01494	-
			-6.77	0.20	-	-40.17	0.01495	-
	1811299-4	HW-E	-6.79	0.20	-	-38.56	0.01497	-
			-6.85	0.20	-	-38.87	0.01497	-
	1811299-5	HW-F	-6.9	0.20	-	-38.28	0.01498	-
			-6.88	0.20	-	-38.15	0.01498	-
	1811299-7	SW-2	-2.67	0.20	-	-18.65	0.01528	-
			-2.61	0.20	-	-20.42	0.01526	-
						-23.04	0.01521	-
12/3/2018	1812198-1	HW-G(S)	-6.74	0.20	-	-38.19	0.01498	-
			-6.93	0.20	-	-37.87	0.01498	-
	1812198-2	HW-G(M)	-7.53	0.20	-	-44.34	0.01498	-
			-7.57	0.20	-	-44.39	0.01498	-
	1812198-3	HW-G(D)	-7.18	0.20	-	-44.15	0.01489	-
			-7.45	0.20	-	-44.56	0.01488	-
	1812198-4	OW-9S	-7.29	0.20	-	-41.86	0.01492	-
			-7.41	0.20	-	-42.94	0.0149	-
	1812198-5	OW-9D	-7.76	0.20	-	-47.91	0.01483	-
			-7.71	0.20	-	-46.82	0.01484	-
					-	-47.20	0.01484	-
	1812198-6	OW-9DD	-7.52	0.20	-	-45.58	0.01486	-
			-7.57	0.20	-	-45.48	0.01487	-
	1812198-7	OW-9M	-7.13	0.20	-	-41.44	0.01493	-
			-7.24	0.20	-	-43.40	0.0149	-
12/7/2018	1812232-1	OW-18S	-7.58	0.20	-	-49.29	0.01481	-
			-7.54	0.20	-	-49.66	0.0148	-
	1812232-2	OW-18M	-6.95	0.20	-	-42.64	0.01491	-
			-6.89	0.20	-	-42.57	0.01491	-
	1812232-3	OW-18D	-7.28	0.20	-	-44.76	0.01488	*
			-7.36	0.20	-	-41.61	0.01493	*
QA/QC	IAEA OH-14	-	-5.64	0.20	-5.6	-37.45	0.01499	-37.70
	IAEA OH-15	-	-9.59	0.20	-9.41	-77.89	0.01436	-78
	IAEA OH-16	-	-15.72	0.20	-15.41	-	-	-113.8
	Antarc IC	-	-29.83	0.19	-30	-	-	-239.69

Table 10. Fire Truck Spray Water PFAS Results ug/L

	Fire Truck Spray Water Spray											
Sample ID	Hose		Roof		Bumper		Officer Side Handline		Driver side-Rear		Officer side-Rear	
Sample Date	8/22/2019	11/12/2019	8/22/2019	11/12/2019	8/22/2019	11/12/2019	8/22/2019	11/12/2019	8/22/2019	11/12/2019	8/22/2019	11/12/2019
Perfluoroheptanoic acid (PFHpA)	0.073	<0.002	0.0045	<0.002	0.0039	<0.002	0.027	<0.002	0.0055	<0.002	0.081	0.0021
Perfluorohexanesulfonic acid (PFHxS)	0.0059	<0.002	0.0033	<0.002	0.0039	<0.002	0.004	<0.002	0.0048	<0.002	0.0043	<0.002
Perfluorononanoic acid (PFNA)	0.011	<0.002	0.0026	<0.002	0.0031	<0.002	0.013	<0.002	0.003	<0.002	0.016	<0.002
Perfluorooctanoic acid (PFOA)	0.088	0.0062	0.0087	<0.002	0.01	<0.002	0.039	<0.002	0.011	<0.002	0.076	0.0041
Perfluorooctane sulfonate (PFOS)	0.009	0.0021	0.0068	<0.002	0.006	<0.002	0.0087	<0.002	0.0093	<0.002	0.0086	<0.002
Perfluorodecanoic Acid (PFDA)	0.014	<0.002	0.004	<0.002	0.0045	<0.002	0.032	<0.002	0.0049	<0.002	0.032	<0.002
Total PFAS	5.7017	0.3391	0.9195	0.0205	0.7817	0.0167	4.1098	0.0481	0.8302	0.0087	5.4701	0.086
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	**0.2009**	0.0083	**0.0299**	<0.002	**0.0314**	<0.002	**0.1237**	<0.002	**0.0385**	<0.002	**0.2179**	0.0041

Notes:

< = Not detected by the laboratory above the reporting limit. Reporting limit shown.

Results in ug/L, micrograms per liter.

Bold results above proposed MassDEP GW-1 standard (0.02 ug/L)

Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <).

Table 11: Total Organic Carbon Levels (mg/kg)

Total Organic Carbon Concentration																	
Sample ID	HW-W dd 3-5 ft	HW-W dd 8-10 ft	HW-W dd 18-20 ft	HW-W dd 23-25 ft	HW-W dd 28-30 ft	HW-W dd 33-35 ft	HW-W dd 38-40 ft	HW-W dd 43-45 ft	HW-W dd 48-50 ft	HW-W dd 58-60 ft	HW-W dd 63-65 ft	S1 0-2ft	S1 2-4ft	S1 4-6ft	S2 0-2ft	S2 2-4ft	S2 4-6ft
Sample Date	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	4/19/2021	4/19/2021	4/19/2021	4/19/2021	4/19/2021	4/19/2021
Sample Depth (ft below grade)	3-5	8-10	18-20	23-25	28-30	33-35	38-40	43-45	48-50	58-60	63-65	0-2	2-4	4-6	0-2	2-4	4-6
Sample Location	Water Department Property	Water Department Property	Water Department Property	Water Department Property	Water Department Property	Water Department Property	Water Department Property	Water Department Property	Water Department Property	Water Department Property	Water Department Property	Deployment Area	Deployment Area	Deployment Area	Deployment Area	Deployment Area	Deployment Area
Total Organic Carbon	94.8 U	94.3 U	96.5 U	93.9 U	95.7 U	93.5 U	96.9 U	95.7 U	95.7 U	95.7 U	95.7 U	28,900	1,150	180	1,550	95.1 U	3,500

Notes:
Results in mg/kg, milligrams per kilogram.
U= Not detected by the Laboratory above the method detection limit. Method detection limit shown.

Table 12.Runway 6/24 Surface Soil Results ug/kg

Sample Location	Surface Soils								
Sample ID	Method 1 Standard		UCL	6-24 A (0-1)	6-24 A (1-2)	6-24 B (0-1)	6-24 B (1-2)	6-24 C (0-1)	6-24 C (1-2)
Sample Date	S-1/GW-1	S-1/GW-3		3/2/2022	3/2/2022	3/2/2022	3/2/2022	3/4/2022	3/4/2022
Perfluoroheptanoic acid (PFHpA)	0.5	300	4,000	<0.051	<0.046	0.068 J	<0.049	<0.055	0.079 J
Perfluorohexanesulfonic acid (PFHxS)	0.3	300	4,000	<0.068	<0.062	<0.064	<0.066	<0.074	<0.069
Perfluorooctanoic acid (PFOA)	0.72	300	4,000	<0.047	0.115 J	0.136 J	0.106 J	0.058 J	0.156 J
Perfluorononanoic acid (PFNA)	0.32	300	4,000	<0.085	<0.077	0.115 J	<0.082	<0.091	<0.085
Perfluorooctane sulfonate (PFOS)	2	300	4,000	0.318	0.361	0.471	0.196 J	0.654	0.297
Perfluorodecanoic Acid (PFDA)	0.3	300	4,000	<0.076	<0.069	<0.071	<0.073	<0.082	<0.076
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	NA	NA	<0.203	<0.184	<0.19	<0.197	<0.219	<0.203
Sum of Laboratory Reported PFAS (Total PFAS) and Sum of Six									
Total PFAS	NA	NA	NA	0.457	0.731	1.312	0.55	1.123	0.85
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	NA	NA	0.318	0.476	0.79	0.302	0.712	0.532

Notes:
< = Not detected by the laboratory above the reporting limit. Reporting limit shown.
J = Estimated concentration between the method detection limit and reporting limit.
Results in ug/kg, micrograms per kilogram.
U= Not detected by the Laboratory above the method detection limit. Method detection limit shown.
Bold results above the Method 1 S-1/GW-1 standard.
Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <).
Sum of six includes estimated values and does not include non-detects (U or <).
UCL = Upper Concentration Limit
Sample depth in feet below grade in parenthesis

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

January 2, 2024

Bryan Massa
Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563

Project Location: Hyannis
Client Job Number:
Project Number: 22071
Laboratory Work Order Number: 23L1211

Enclosed are results of analyses for samples as received by the laboratory on December 8, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kaitlyn A. Feliciano
Project Manager

Table of Contents

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563
ATTN: Bryan Massa

REPORT DATE: 1/2/2024

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 22071

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23L1211

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Hyannis

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
HW-I(S)	23L1211-01	Ground Water		SOP-454 PFAS	
HW-I(M)	23L1211-02	Ground Water		SOP-454 PFAS	
HW-I(D)	23L1211-03	Ground Water		SOP-454 PFAS	
HW-P(S)	23L1211-04	Ground Water		SOP-454 PFAS	
HW-P(M)	23L1211-05	Ground Water		SOP-454 PFAS	
HW-3	23L1211-06	Ground Water		SOP-454 PFAS	
HW-302	23L1211-07	Ground Water		SOP-454 PFAS	
HW--S(S)	23L1211-08	Ground Water		SOP-454 PFAS	
HW--S(M)	23L1211-09	Ground Water		SOP-454 PFAS	
ME-1	23L1211-10	Ground Water		SOP-454 PFAS	
ME-2	23L1211-11	Ground Water		SOP-454 PFAS	
ME-3	23L1211-12	Ground Water		SOP-454 PFAS	

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CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

SOP-454 PFAS

Qualifications:

L-01

Laboratory fortified blank/laboratory control sample recovery outside of control limits. Data validation is not affected since all results are "not detected" for all samples in this batch for this compound and bias is on the high side.

Analyte & Samples(s) Qualified:

N-EtFOSAA (NEtFOSAA)
B361067-BSD1

Perfluorononanesulfonic acid (PFNS)
B361067-BSD1

L-02

Laboratory fortified blank/laboratory control sample recovery and duplicate recoveries outside of control limits. Data validation is not affected since all results are "not detected" for associated samples in this batch and bias is on the high side.

Analyte & Samples(s) Qualified:

N-MeFOSAA (NMeFOSAA)
B361067-BS1, B361067-BSD1

PF-17

Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.

Analyte & Samples(s) Qualified:

D3-NMeFOSAA
23L1211-08[HW--S(S)]

D5-NEtFOSAA
23L1211-08[HW--S(S)]

M2-6:2FTS
23L1211-01[HW-I(S)], 23L1211-02[HW-I(M)], 23L1211-08[HW--S(S)]

PF-19

Sample re-analyzed at a dilution that was re-fortified with internal standard.

Analyte & Samples(s) Qualified:

6:2 Fluorotelomersulfonic acid (6:2FTS A)
23L1211-08RE2[HW--S(S)]

Perfluorooctanesulfonic acid (PFOS)
23L1211-08RE1[HW--S(S)]

Perfluoropentanoic acid (PFPeA)
23L1211-08RE1[HW--S(S)]

S-29

Extracted Internal Standard is outside of control limits.

Analyte & Samples(s) Qualified:

D3-NMeFOSAA
23L1211-03[HW-I(D)], 23L1211-07[HW-302], 23L1211-09[HW--S(M)], 23L1211-10[ME-1]

D5-NEtFOSAA
23L1211-03[HW-I(D)], 23L1211-07[HW-302], 23L1211-09[HW--S(M)], 23L1211-10[ME-1]

M2-4:2FTS
23L1211-01[HW-I(S)], 23L1211-02[HW-I(M)], 23L1211-03[HW-I(D)], 23L1211-04[HW-P(S)], 23L1211-05[HW-P(M)], 23L1211-06[HW-3], 23L1211-07[HW-302], 23L1211-08[HW--S(S)], 23L1211-09[HW--S(M)], 23L1211-10[ME-1], 23L1211-11[ME-2], 23L1211-12[ME-3], B361067-BS1, B361067-BSD1

M2-6:2FTS
23L1211-03[HW-I(D)], 23L1211-07[HW-302], 23L1211-09[HW--S(M)], 23L1211-10[ME-1]

M2-8:2FTS
23L1211-07[HW-302], 23L1211-10[ME-1], 23L1211-12[ME-3]

M2PFTA
23L1211-07[HW-302], 23L1211-08[HW--S(S)]

M7PFUnA
23L1211-07[HW-302], 23L1211-10[ME-1]

MPFDoA
23L1211-07[HW-302], 23L1211-10[ME-1]

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The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa A. Worthington
Technical Representative

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Hyannis | Sample Description: | Work Order: 23L1211

Date Received: 12/8/2023

Field Sample #: HW-I(S) | Sampled: 12/5/2023 10:10

Sample ID: 23L1211-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	47	1.7	0.64	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorobutanesulfonic acid (PFBS)	1.3	1.7	0.64	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluoropentanoic acid (PFPeA)	160	1.7	0.69	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorohexanoic acid (PFHxA)	110	1.7	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.7	0.65	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.7	0.64	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.7	0.90	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.7	0.51	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	7.0	1.7	0.83	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorodecanoic acid (PFDA)	ND	1.7	0.72	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.7	0.80	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.7	0.64	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluoroheptanesulfonic acid (PFHpS)	28	1.7	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.7	0.69	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.7	0.90	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.7	0.83	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.7	0.72	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.7	0.67	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.7	0.90	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.7	0.88	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.7	0.89	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	14	1.7	0.91	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluoro-1-butanesulfonamide (FBSA)	1.4	1.7	0.68	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorohexanesulfonic acid (PFHxS)	40	1.7	0.62	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.7	0.62	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.7	0.56	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.7	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.1	1.7	0.66	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.7	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.7	0.67	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluoroheptanoic acid (PFHpA)	100	1.7	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorooctanoic acid (PFOA)	140	1.7	1.2	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorooctanesulfonic acid (PFOS)	140	1.7	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW
Perfluorononanoic acid (PFNA)	150	1.7	0.80	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:23	QNW

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Project Location: Hyannis | Sample Description: | Work Order: 23L1211

Date Received: 12/8/2023

Field Sample #: HW-I(M) | Sampled: 12/5/2023 12:00

Sample ID: 23L1211-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	1.6	1.9	0.71	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluoropentanoic acid (PFPeA)	1.9	1.9	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorohexanoic acid (PFHxA)	1.7	1.9	0.78	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.9	0.72	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.9	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.99	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.56	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.91	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorodecanoic acid (PFDA)	ND	1.9	0.79	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.88	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	0.78	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.9	0.77	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.9	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.91	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.79	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.99	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.97	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.98	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorohexanesulfonic acid (PFHxS)	7.2	1.9	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.62	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	1.2	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluoropentanesulfonic acid (PFPeS)	ND	1.9	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.82	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluoroheptanoic acid (PFHpA)	1.8	1.9	0.81	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorooctanoic acid (PFOA)	ND	1.9	1.3	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorooctanesulfonic acid (PFOS)	8.1	1.9	0.81	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW
Perfluorononanoic acid (PFNA)	ND	1.9	0.88	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 14:31	QNW

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Project Location: Hyannis | Sample Description: | Work Order: 23L1211

Date Received: 12/8/2023

Field Sample #: HW-I(D) | Sampled: 12/5/2023 11:15

Sample ID: 23L1211-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	42	1.8	0.67	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorobutanesulfonic acid (PFBS)	1.2	1.8	0.67	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluoropentanoic acid (PFPeA)	120	1.8	0.72	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorohexanoic acid (PFHxA)	85	1.8	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.87	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorodecanoic acid (PFDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.84	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluoroheptanesulfonic acid (PFHpS)	1.4	1.8	0.74	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.95	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.8	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorohexanesulfonic acid (PFHxS)	23	1.8	0.65	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.65	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.59	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	1.1	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluoropentanesulfonic acid (PFPeS)	1.4	1.8	0.69	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluoroheptanoic acid (PFHpA)	23	1.8	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorooctanoic acid (PFOA)	19	1.8	1.2	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorooctanesulfonic acid (PFOS)	94	1.8	0.77	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW
Perfluorononanoic acid (PFNA)	1.4	1.8	0.84	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:07	QNW

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Project Location: Hyannis | Sample Description: | Work Order: 23L1211

Date Received: 12/8/2023

Field Sample #: HW-P(S) | Sampled: 12/5/2023 13:15

Sample ID: 23L1211-04

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	16	2.0	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluoropentanoic acid (PFPeA)	43	2.0	0.79	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorohexanoic acid (PFHxA)	19	2.0	0.81	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
11Cl-PF3OUdS (F53B Major)	ND	2.0	0.75	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
9Cl-PF3ONS (F53B Minor)	ND	2.0	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.0	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.0	0.59	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	1.0	2.0	0.95	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorodecanoic acid (PFDA)	ND	2.0	0.83	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorododecanoic acid (PFDoA)	ND	2.0	0.92	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.0	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.0	0.82	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
N-EtFOSAA (NEtFOSAA)	ND	2.0	0.80	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
N-MeFOSAA (NMeFOSAA)	ND	2.0	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorotetradecanoic acid (PFTA)	ND	2.0	0.95	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	2.0	0.82	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.0	0.77	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	2.0	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorooctanesulfonamide (FOSA)	ND	2.0	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorononanesulfonic acid (PFNS)	ND	2.0	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.0	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluoro-1-butanesulfonamide (FBSA)	ND	2.0	0.78	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorohexanesulfonic acid (PFHxS)	1.8	2.0	0.71	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.0	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.0	0.65	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	1.6	2.0	1.2	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluoropentanesulfonic acid (PFPeS)	ND	2.0	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluoroundecanoic acid (PFUnA)	ND	2.0	0.85	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.0	0.77	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluoroheptanoic acid (PFHpA)	7.6	2.0	0.84	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorooctanoic acid (PFOA)	3.4	2.0	1.4	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorooctanesulfonic acid (PFOS)	2.4	2.0	0.85	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW
Perfluorononanoic acid (PFNA)	13	2.0	0.92	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:14	QNW

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Project Location: Hyannis | Sample Description: | Work Order: 23L1211

Date Received: 12/8/2023

Field Sample #: HW-P(M) | Sampled: 12/5/2023 15:55

Sample ID: 23L1211-05

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	4.8	1.9	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	0.69	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluoropentanoic acid (PFPeA)	13	1.9	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorohexanoic acid (PFHxA)	7.6	1.9	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.9	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.9	0.69	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.97	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.55	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.89	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorodecanoic acid (PFDA)	ND	1.9	0.78	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.86	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.69	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluoroheptanesulfonic acid (PFHpS)	1.8	1.9	0.77	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.9	0.75	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.9	0.98	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.89	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.77	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.72	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.97	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.95	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.96	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	0.98	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorohexanesulfonic acid (PFHxS)	21	1.9	0.67	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.67	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.61	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	1.1	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluoropentanesulfonic acid (PFPeS)	1.4	1.9	0.71	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.80	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluoroheptanoic acid (PFHpA)	5.2	1.9	0.79	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorooctanoic acid (PFOA)	5.5	1.9	1.3	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorooctanesulfonic acid (PFOS)	40	1.9	0.79	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW
Perfluorononanoic acid (PFNA)	7.3	1.9	0.86	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:22	QNW

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Project Location: Hyannis | Sample Description: | Work Order: 23L1211

Date Received: 12/8/2023

Field Sample #: HW-3 | Sampled: 12/6/2023 10:30

Sample ID: 23L1211-06

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	29	1.9	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorobutanesulfonic acid (PFBS)	1.3	1.9	0.70	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluoropentanoic acid (PFPeA)	110	1.9	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorohexanoic acid (PFHxA)	77	1.9	0.78	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.9	0.72	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.9	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.99	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.56	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	5.4	1.9	0.91	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorodecanoic acid (PFDA)	ND	1.9	0.79	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.88	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluoroheptanesulfonic acid (PFHpS)	4.1	1.9	0.78	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.9	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.9	0.99	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.91	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.79	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.98	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.97	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.97	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorohexanesulfonic acid (PFHxS)	30	1.9	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.62	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	130	1.9	1.2	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.1	1.9	0.72	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluoroundecanoic acid (PFUnA)	2.5	1.9	0.81	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluoroheptanoic acid (PFHpA)	18	1.9	0.80	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorooctanoic acid (PFOA)	15	1.9	1.3	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorooctanesulfonic acid (PFOS)	44	1.9	0.81	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW
Perfluorononanoic acid (PFNA)	9.2	1.9	0.88	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:29	QNW

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Project Location: Hyannis | Sample Description: | Work Order: 23L1211

Date Received: 12/8/2023

Field Sample #: HW-302 | Sampled: 12/6/2023 10:55

Sample ID: 23L1211-07

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	15	1.8	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluoropentanoic acid (PFPeA)	47	1.8	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorohexanoic acid (PFHxA)	24	1.8	0.75	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.69	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.95	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.54	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	3.7	1.8	0.88	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorodecanoic acid (PFDA)	1.6	1.8	0.76	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorododecanoic acid (PFDoA)	0.87	1.8	0.85	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluoroheptanesulfonic acid (PFHpS)	0.79	1.8	0.75	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.96	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.87	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.95	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorooctanesulfonamide (FOSA)	1.3	1.8	0.93	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.97	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.8	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorohexanesulfonic acid (PFHxS)	8.4	1.8	0.66	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.65	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.60	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	26	1.8	1.1	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluoropentanesulfonic acid (PFPeS)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluoroundecanoic acid (PFUnA)	3.8	1.8	0.78	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluoroheptanoic acid (PFHpA)	12	1.8	0.77	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorooctanoic acid (PFOA)	11	1.8	1.2	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorooctanesulfonic acid (PFOS)	21	1.8	0.78	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW
Perfluorononanoic acid (PFNA)	33	1.8	0.85	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:36	QNW

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Project Location: Hyannis | Sample Description: | Work Order: 23L1211

Date Received: 12/8/2023

Field Sample #: HW--S(S) | Sampled: 12/6/2023 11:30

Sample ID: 23L1211-08

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	50	2.0	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluorobutanesulfonic acid (PFBS)	1.8	2.0	0.73	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluoropentanoic acid (PFPeA)	180	20	7.8	ng/L	10	PF-19	SOP-454 PFAS	12/19/23	12/21/23 13:45	QNW
Perfluorohexanoic acid (PFHxA)	140	2.0	0.80	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
11Cl-PF3OUdS (F53B Major)	ND	2.0	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
9Cl-PF3ONS (F53B Minor)	ND	2.0	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.0	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.0	0.58	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.0	0.94	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluorodecanoic acid (PFDA)	ND	2.0	0.82	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluorododecanoic acid (PFDoA)	ND	2.0	0.91	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.0	0.72	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluoroheptanesulfonic acid (PFHpS)	15	2.0	0.80	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
N-EtFOSAA (NEtFOSAA)	ND	2.0	0.79	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
N-MeFOSAA (NMeFOSAA)	ND	2.0	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluorotetradecanoic acid (PFTA)	ND	2.0	0.94	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	2.0	0.81	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.0	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	2.0	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluorooctanesulfonamide (FOSA)	ND	2.0	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluorononanesulfonic acid (PFNS)	ND	2.0	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	3.9	2.0	1.0	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluoro-1-butanesulfonamide (FBSA)	1.4	2.0	0.77	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluorohexanesulfonic acid (PFHxS)	67	2.0	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.0	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.0	0.64	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	2400	98	59	ng/L	50	PF-19	SOP-454 PFAS	12/19/23	12/21/23 14:44	QNW
Perfluoropentanesulfonic acid (PFPeS)	3.6	2.0	0.75	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluoroundecanoic acid (PFUnA)	ND	2.0	0.84	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.0	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluoroheptanoic acid (PFHpA)	90	2.0	0.83	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluorooctanoic acid (PFOA)	120	2.0	1.3	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW
Perfluorooctanesulfonic acid (PFOS)	150	20	8.3	ng/L	10	PF-19	SOP-454 PFAS	12/19/23	12/21/23 13:45	QNW
Perfluorononanoic acid (PFNA)	180	2.0	0.91	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:43	QNW

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Project Location: Hyannis | Sample Description: | Work Order: 23L1211

Date Received: 12/8/2023

Field Sample #: HW--S(M) | Sampled: 12/6/2023 11:55

Sample ID: 23L1211-09

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	1.7	1.8	0.69	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluoropentanoic acid (PFPeA)	4.5	1.8	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorohexanoic acid (PFHxA)	2.6	1.8	0.75	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.96	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.54	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.88	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorodecanoic acid (PFDA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.85	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.96	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.88	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.95	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.97	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.8	0.72	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorohexanesulfonic acid (PFHxS)	5.0	1.8	0.66	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.60	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	11	1.8	1.1	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluoropentanesulfonic acid (PFPeS)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.79	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.72	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluoroheptanoic acid (PFHpA)	1.3	1.8	0.78	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorooctanoic acid (PFOA)	1.4	1.8	1.3	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorooctanesulfonic acid (PFOS)	17	1.8	0.78	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW
Perfluorononanoic acid (PFNA)	1.9	1.8	0.85	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:51	QNW

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Project Location: Hyannis | Sample Description: | Work Order: 23L1211

Date Received: 12/8/2023

Field Sample #: ME-1 | Sampled: 12/6/2023 14:17

Sample ID: 23L1211-10

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	18	1.8	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorobutanesulfonic acid (PFBS)	2.8	1.8	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluoropentanoic acid (PFPeA)	53	1.8	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorohexanoic acid (PFHxA)	33	1.8	0.75	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.69	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.95	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.54	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.88	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorodecanoic acid (PFDA)	0.86	1.8	0.76	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.85	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.1	1.8	0.75	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.96	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.87	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.95	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.96	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluoro-1-butanesulfonamide (FBSA)	1.1	1.8	0.71	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorohexanesulfonic acid (PFHxS)	38	1.8	0.65	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.65	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.60	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	22	1.8	1.1	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.4	1.8	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.78	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.71	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluoroheptanoic acid (PFHpA)	15	1.8	0.77	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorooctanoic acid (PFOA)	19	1.8	1.2	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorooctanesulfonic acid (PFOS)	75	1.8	0.78	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW
Perfluorononanoic acid (PFNA)	12	1.8	0.85	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 15:58	QNW

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Project Location: Hyannis | Sample Description: | Work Order: 23L1211

Date Received: 12/8/2023

Field Sample #: ME-2 | Sampled: 12/6/2023 14:05

Sample ID: 23L1211-11

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	15	1.8	0.67	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorobutanesulfonic acid (PFBS)	4.7	1.8	0.67	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluoropentanoic acid (PFPeA)	52	1.8	0.72	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorohexanoic acid (PFHxA)	37	1.8	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	7.4	1.8	0.87	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorodecanoic acid (PFDA)	0.86	1.8	0.75	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.84	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.4	1.8	0.74	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.73	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.95	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.95	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluoro-1-butanesulfonamide (FBSA)	1.5	1.8	0.71	ng/L	1	J	SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorohexanesulfonic acid (PFHxS)	46	1.8	0.65	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.65	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.59	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	70	1.8	1.1	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluoropentanesulfonic acid (PFPeS)	3.6	1.8	0.69	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluoroheptanoic acid (PFHpA)	17	1.8	0.76	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorooctanoic acid (PFOA)	16	1.8	1.2	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorooctanesulfonic acid (PFOS)	70	1.8	0.77	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW
Perfluorononanoic acid (PFNA)	11	1.8	0.84	ng/L	1		SOP-454 PFAS	12/19/23	12/20/23 16:05	QNW

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Project Location: Hyannis | Sample Description: | Work Order: 23L1211

Date Received: 12/8/2023

Field Sample #: ME-3 | Sampled: 12/6/2023 14:10

Sample ID: 23L1211-12

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	12	1.8	0.67	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorobutanesulfonic acid (PFBS)	3.0	1.8	0.67	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluoropentanoic acid (PFPeA)	36	1.8	0.72	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorohexanoic acid (PFHxA)	27	1.8	0.74	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorodecanoic acid (PFDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.83	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.1	1.8	0.74	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.72	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorooctanesulfonamide (FOSA)	9.9	1.8	0.92	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	2.1	1.8	0.95	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluoro-1-butanesulfonamide (FBSA)	1.5	1.8	0.70	ng/L	1	J	SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorohexanesulfonic acid (PFHxS)	38	1.8	0.64	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.64	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.59	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	14	1.8	1.1	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.6	1.8	0.69	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluoroundecanoic acid (PFUnA)	0.98	1.8	0.77	ng/L	1	J	SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluoroheptanoic acid (PFHpA)	12	1.8	0.76	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorooctanoic acid (PFOA)	16	1.8	1.2	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorooctanesulfonic acid (PFOS)	94	1.8	0.77	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW
Perfluorononanoic acid (PFNA)	8.7	1.8	0.83	ng/L	1		SOP-454 PFAS	12/27/23	1/2/24 12:08	QNW

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Sample Extraction Data

Prep Method:SOP 454-PFAAS **Analytical Method:SOP-454 PFAS**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23L1211-01 [HW-I(S)]	B361025	289	1.00	12/19/23
23L1211-02 [HW-I(M)]	B361025	262	1.00	12/19/23
23L1211-03 [HW-I(D)]	B361025	276	1.00	12/19/23
23L1211-04 [HW-P(S)]	B361025	251	1.00	12/19/23
23L1211-05 [HW-P(M)]	B361025	268	1.00	12/19/23
23L1211-06 [HW-3]	B361025	263	1.00	12/19/23
23L1211-07 [HW-302]	B361025	273	1.00	12/19/23
23L1211-08 [HW--S(S)]	B361025	255	1.00	12/19/23
23L1211-08RE1 [HW--S(S)]	B361025	255	1.00	12/19/23
23L1211-08RE2 [HW--S(S)]	B361025	255	1.00	12/19/23
23L1211-09 [HW--S(M)]	B361025	271	1.00	12/19/23
23L1211-10 [ME-1]	B361025	273	1.00	12/19/23
23L1211-11 [ME-2]	B361025	276	1.00	12/19/23

Prep Method:SOP 454-PFAAS **Analytical Method:SOP-454 PFAS**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23L1211-12 [ME-3]	B361067	277	1.00	12/27/23

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B361025 - SOP 454-PFAAS										
Blank (B361025-BLK1)				Prepared: 12/19/23 Analyzed: 12/20/23						
Perfluorobutanoic acid (PFBA)	ND	1.9	ng/L							
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	ng/L							
Perfluoropentanoic acid (PFPeA)	ND	1.9	ng/L							
Perfluorohexanoic acid (PFHxA)	ND	1.9	ng/L							
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L							
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L							
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L							
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L							
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	ng/L							
Perfluorodecanoic acid (PFDA)	ND	1.9	ng/L							
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L							
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	ng/L							
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	ng/L							
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L							
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L							
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L							
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L							
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L							
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L							
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L							
Perfluorononanesulfonic acid (PFNS)	ND	1.9	ng/L							
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	ng/L							
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	ng/L							
Perfluorohexanesulfonic acid (PFHxS)	ND	1.9	ng/L							
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L							
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L							
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	ng/L							
Perfluoropentanesulfonic acid (PFPeS)	ND	1.9	ng/L							
Perfluoroundecanoic acid (PFUnA)	ND	1.9	ng/L							
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L							
Perfluoroheptanoic acid (PFHpA)	ND	1.9	ng/L							
Perfluorooctanoic acid (PFOA)	ND	1.9	ng/L							
Perfluorooctanesulfonic acid (PFOS)	ND	1.9	ng/L							
Perfluorononanoic acid (PFNA)	ND	1.9	ng/L							
LCS (B361025-BS1)				Prepared: 12/19/23 Analyzed: 12/20/23						
Perfluorobutanoic acid (PFBA)	8.84	1.9	ng/L	9.51		92.9	73-129			
Perfluorobutanesulfonic acid (PFBS)	7.64	1.9	ng/L	8.42		90.8	72-130			
Perfluoropentanoic acid (PFPeA)	8.72	1.9	ng/L	9.51		91.7	72-129			
Perfluorohexanoic acid (PFHxA)	8.79	1.9	ng/L	9.51		92.4	72-129			
11Cl-PF3OUdS (F53B Major)	8.69	1.9	ng/L	8.96		96.9	43.3-138			
9Cl-PF3ONS (F53B Minor)	9.27	1.9	ng/L	8.87		105	52-140			
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	8.14	1.9	ng/L	8.96		90.8	53.7-152			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	7.65	1.9	ng/L	9.51		80.4	42.1-145			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	8.40	1.9	ng/L	9.13		91.9	67-138			
Perfluorodecanoic acid (PFDA)	9.70	1.9	ng/L	9.51		102	71-129			
Perfluorododecanoic acid (PFDoA)	9.73	1.9	ng/L	9.51		102	72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	9.79	1.9	ng/L	8.47		116	52.7-147			

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B361025 - SOP 454-PFAAS										
LCS (B361025-BS1)				Prepared: 12/19/23 Analyzed: 12/20/23						
Perfluoroheptanesulfonic acid (PFHpS)	8.79	1.9	ng/L	9.08		96.7	69-134			
N-EtFOSAA (NEtFOSAA)	10.0	1.9	ng/L	9.51		106	61-135			
N-MeFOSAA (NMeFOSAA)	10.0	1.9	ng/L	9.51		105	65-136			
Perfluorotetradecanoic acid (PFTA)	9.40	1.9	ng/L	9.51		98.8	71-132			
Perfluorotridecanoic acid (PFTrDA)	9.19	1.9	ng/L	9.51		96.6	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	7.93	1.9	ng/L	8.89		89.1	63-143			
Perfluorodecanesulfonic acid (PFDS)	7.47	1.9	ng/L	9.18		81.4	53-142			
Perfluorooctanesulfonamide (FOSA)	9.20	1.9	ng/L	9.51		96.7	67-137			
Perfluorononanesulfonic acid (PFNS)	7.89	1.9	ng/L	9.13		86.4	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	6.84	1.9	ng/L	9.51		71.9	50-150			
Perfluoro-1-butanesulfonamide (FBSA)	7.06	1.9	ng/L	9.51		74.3	50-150			
Perfluorohexanesulfonic acid (PFHxS)	8.18	1.9	ng/L	8.70		93.9	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	9.61	1.9	ng/L	9.51		101	53.8-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	10.0	1.9	ng/L	9.51		105	54.5-152			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	9.06	1.9	ng/L	9.04		100	64-140			
Perfluoropentanesulfonic acid (PFPeS)	7.84	1.9	ng/L	8.94		87.6	71-127			
Perfluoroundecanoic acid (PFUnA)	9.30	1.9	ng/L	9.51		97.7	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	8.07	1.9	ng/L	9.51		84.9	50.5-159			
Perfluoroheptanoic acid (PFHpA)	8.96	1.9	ng/L	9.51		94.2	72-130			
Perfluorooctanoic acid (PFOA)	8.97	1.9	ng/L	9.51		94.3	71-133			
Perfluorooctanesulfonic acid (PFOS)	8.47	1.9	ng/L	8.80		96.2	65-140			
Perfluorononanoic acid (PFNA)	9.25	1.9	ng/L	9.51		97.2	69-130			
LCS Dup (B361025-BSD1)				Prepared: 12/19/23 Analyzed: 12/20/23						
Perfluorobutanoic acid (PFBA)	8.18	1.9	ng/L	9.67		84.6	73-129	7.65	30	
Perfluorobutanesulfonic acid (PFBS)	6.97	1.9	ng/L	8.56		81.4	72-130	9.17	30	
Perfluoropentanoic acid (PFPeA)	8.31	1.9	ng/L	9.67		85.9	72-129	4.79	30	
Perfluorohexanoic acid (PFHxA)	7.97	1.9	ng/L	9.67		82.4	72-129	9.83	30	
11Cl-PF3OUdS (F53B Major)	7.62	1.9	ng/L	9.11		83.6	43.3-138	13.1	30	
9Cl-PF3ONS (F53B Minor)	8.22	1.9	ng/L	9.02		91.2	52-140	11.9	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	7.38	1.9	ng/L	9.11		81.0	53.7-152	9.80	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	8.47	1.9	ng/L	9.67		87.6	42.1-145	10.3	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	8.00	1.9	ng/L	9.29		86.2	67-138	4.82	30	
Perfluorodecanoic acid (PFDA)	9.02	1.9	ng/L	9.67		93.2	71-129	7.31	30	
Perfluorododecanoic acid (PFDoA)	8.99	1.9	ng/L	9.67		92.9	72-134	7.92	30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	9.09	1.9	ng/L	8.61		106	52.7-147	7.37	30	
Perfluoroheptanesulfonic acid (PFHpS)	8.18	1.9	ng/L	9.24		88.6	69-134	7.12	30	
N-EtFOSAA (NEtFOSAA)	8.92	1.9	ng/L	9.67		92.2	61-135	11.9	30	
N-MeFOSAA (NMeFOSAA)	9.54	1.9	ng/L	9.67		98.6	65-136	4.76	30	
Perfluorotetradecanoic acid (PFTA)	8.52	1.9	ng/L	9.67		88.1	71-132	9.84	30	
Perfluorotridecanoic acid (PFTrDA)	8.60	1.9	ng/L	9.67		88.9	65-144	6.63	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	7.39	1.9	ng/L	9.05		81.7	63-143	7.07	30	
Perfluorodecanesulfonic acid (PFDS)	7.09	1.9	ng/L	9.34		75.9	53-142	5.24	30	
Perfluorooctanesulfonamide (FOSA)	8.41	1.9	ng/L	9.67		86.9	67-137	9.02	30	
Perfluorononanesulfonic acid (PFNS)	7.17	1.9	ng/L	9.29		77.2	69-127	9.66	30	
Perfluoro-1-hexanesulfonamide (FHxSA)	5.85	1.9	ng/L	9.67		60.5	50-150	15.6	30	
Perfluoro-1-butanesulfonamide (FBSA)	6.09	1.9	ng/L	9.67		63.0	50-150	14.8	30	
Perfluorohexanesulfonic acid (PFHxS)	7.70	1.9	ng/L	8.85		87.0	68-131	5.95	30	
Perfluoro-4-oxapentanoic acid (PFMPA)	9.01	1.9	ng/L	9.67		93.2	53.8-150	6.38	30	
Perfluoro-5-oxahexanoic acid (PFMBA)	9.42	1.9	ng/L	9.67		97.4	54.5-152	6.14	30	

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B361025 - SOP 454-PFAAS										
LCS Dup (B361025-BSD1)				Prepared: 12/19/23 Analyzed: 12/20/23						
6:2 Fluorotelomersulfonic acid (6:2FTS A)	8.57	1.9	ng/L	9.19		93.3	64-140	5.51	30	
Perfluoropentanesulfonic acid (PFPeS)	7.32	1.9	ng/L	9.09		80.5	71-127	6.76	30	
Perfluoroundecanoic acid (PFUnA)	8.57	1.9	ng/L	9.67		88.5	69-133	8.19	30	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	7.33	1.9	ng/L	9.67		75.8	50.5-159	9.65	30	
Perfluoroheptanoic acid (PFHpA)	8.35	1.9	ng/L	9.67		86.3	72-130	7.04	30	
Perfluorooctanoic acid (PFOA)	8.21	1.9	ng/L	9.67		84.9	71-133	8.82	30	
Perfluorooctanesulfonic acid (PFOS)	7.45	1.9	ng/L	8.95		83.3	65-140	12.7	30	
Perfluorononanoic acid (PFNA)	8.35	1.9	ng/L	9.67		86.3	69-130	10.2	30	
Batch B361067 - SOP 454-PFAAS										
Blank (B361067-BLK1)				Prepared: 12/27/23 Analyzed: 12/28/23						
Perfluorobutanoic acid (PFBA)	ND	1.9	ng/L							
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	ng/L							
Perfluoropentanoic acid (PFPeA)	ND	1.9	ng/L							
Perfluorohexanoic acid (PFHxA)	ND	1.9	ng/L							
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L							
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L							
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L							
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L							
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	ng/L							
Perfluorodecanoic acid (PFDA)	ND	1.9	ng/L							
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L							
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	ng/L							
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	ng/L							
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L							
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L							
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L							
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L							
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L							
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L							
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L							
Perfluorononanesulfonic acid (PFNS)	ND	1.9	ng/L							
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	ng/L							
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	ng/L							
Perfluorohexanesulfonic acid (PFHxS)	ND	1.9	ng/L							
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L							
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L							
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	ng/L							
Perfluoropentanesulfonic acid (PFPeS)	ND	1.9	ng/L							
Perfluoroundecanoic acid (PFUnA)	ND	1.9	ng/L							
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L							
Perfluoroheptanoic acid (PFHpA)	ND	1.9	ng/L							
Perfluorooctanoic acid (PFOA)	ND	1.9	ng/L							
Perfluorooctanesulfonic acid (PFOS)	ND	1.9	ng/L							
Perfluorononanoic acid (PFNA)	ND	1.9	ng/L							

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B361067 - SOP 454-PFAAS											
LCS (B361067-BS1)				Prepared: 12/27/23 Analyzed: 12/28/23							
Perfluorobutanoic acid (PFBA)	11.2	1.9	ng/L	9.26		121		73-129			
Perfluorobutanesulfonic acid (PFBS)	9.50	1.9	ng/L	8.19		116		72-130			
Perfluoropentanoic acid (PFPeA)	11.2	1.9	ng/L	9.26		121		72-129			
Perfluorohexanoic acid (PFHxA)	11.2	1.9	ng/L	9.26		121		72-129			
11Cl-PF3OUdS (F53B Major)	8.67	1.9	ng/L	8.72		99.4		43.3-138			
9Cl-PF3ONS (F53B Minor)	9.00	1.9	ng/L	8.63		104		52-140			
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	8.97	1.9	ng/L	8.72		103		53.7-152			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	10.9	1.9	ng/L	9.26		117		42.1-145			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	11.1	1.9	ng/L	8.89		125		67-138			
Perfluorodecanoic acid (PFDA)	10.9	1.9	ng/L	9.26		118		71-129			
Perfluorododecanoic acid (PFDoA)	10.7	1.9	ng/L	9.26		115		72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	10.5	1.9	ng/L	8.24		127		52.7-147			
Perfluoroheptanesulfonic acid (PFHpS)	10.7	1.9	ng/L	8.84		122		69-134			
N-EtFOSAA (NEtFOSAA)	11.3	1.9	ng/L	9.26		122		61-135			
N-MeFOSAA (NMeFOSAA)	13.5	1.9	ng/L	9.26		**146**	*	65-136			L-02
Perfluorotetradecanoic acid (PFTA)	10.0	1.9	ng/L	9.26		108		71-132			
Perfluorotridecanoic acid (PFTrDA)	10.3	1.9	ng/L	9.26		112		65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	10.2	1.9	ng/L	8.65		117		63-143			
Perfluorodecanesulfonic acid (PFDS)	9.17	1.9	ng/L	8.93		103		53-142			
Perfluorooctanesulfonamide (FOSA)	11.3	1.9	ng/L	9.26		122		67-137			
Perfluorononanesulfonic acid (PFNS)	8.77	1.9	ng/L	8.89		98.7		69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	10.1	1.9	ng/L	9.26		109		50-150			
Perfluoro-1-butanesulfonamide (FBSA)	10.3	1.9	ng/L	9.26		111		50-150			
Perfluorohexanesulfonic acid (PFHxS)	9.64	1.9	ng/L	8.47		114		68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	10.4	1.9	ng/L	9.26		112		53.8-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	11.0	1.9	ng/L	9.26		119		54.5-152			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	11.8	1.9	ng/L	8.79		134		64-140			
Perfluoropentanesulfonic acid (PFPeS)	10.8	1.9	ng/L	8.70		124		71-127			
Perfluoroundecanoic acid (PFUnA)	11.2	1.9	ng/L	9.26		122		69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	9.62	1.9	ng/L	9.26		104		50.5-159			
Perfluoroheptanoic acid (PFHpA)	10.4	1.9	ng/L	9.26		112		72-130			
Perfluorooctanoic acid (PFOA)	11.2	1.9	ng/L	9.26		121		71-133			
Perfluorooctanesulfonic acid (PFOS)	10.4	1.9	ng/L	8.56		122		65-140			
Perfluorononanoic acid (PFNA)	11.3	1.9	ng/L	9.26		123		69-130			
LCS Dup (B361067-BSD1)				Prepared: 12/27/23 Analyzed: 12/28/23							
Perfluorobutanoic acid (PFBA)	11.3	1.8	ng/L	9.12		123		73-129	0.751	30	
Perfluorobutanesulfonic acid (PFBS)	9.95	1.8	ng/L	8.07		123		72-130	4.62	30	
Perfluoropentanoic acid (PFPeA)	11.5	1.8	ng/L	9.12		126		72-129	2.72	30	
Perfluorohexanoic acid (PFHxA)	11.8	1.8	ng/L	9.12		129		72-129	5.58	30	
11Cl-PF3OUdS (F53B Major)	10.1	1.8	ng/L	8.59		118		43.3-138	15.4	30	
9Cl-PF3ONS (F53B Minor)	10.4	1.8	ng/L	8.50		123		52-140	14.9	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	8.57	1.8	ng/L	8.59		99.8		53.7-152	4.54	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	9.68	1.8	ng/L	9.12		106		42.1-145	11.4	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	11.7	1.8	ng/L	8.76		133		67-138	5.04	30	
Perfluorodecanoic acid (PFDA)	11.6	1.8	ng/L	9.12		127		71-129	6.05	30	
Perfluorododecanoic acid (PFDoA)	11.2	1.8	ng/L	9.12		122		72-134	4.36	30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	10.7	1.8	ng/L	8.12		131		52.7-147	1.47	30	

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B361067 - SOP 454-PFAAS											
LCS Dup (B361067-BSD1)				Prepared: 12/27/23 Analyzed: 12/28/23							
Perfluoroheptanesulfonic acid (PFHpS)	11.6	1.8	ng/L	8.71		133		69-134	7.28	30	
N-EtFOSAA (NEtFOSAA)	13.3	1.8	ng/L	9.12		**146**	*	61-135	16.5	30	L-01
N-MeFOSAA (NMeFOSAA)	13.7	1.8	ng/L	9.12		**150**	*	65-136	1.33	30	L-02
Perfluorotetradecanoic acid (PFTA)	10.3	1.8	ng/L	9.12		113		71-132	2.55	30	
Perfluorotridecanoic acid (PFTrDA)	10.8	1.8	ng/L	9.12		119		65-144	4.64	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	10.5	1.8	ng/L	8.53		123		63-143	3.20	30	
Perfluorodecanesulfonic acid (PFDS)	9.87	1.8	ng/L	8.80		112		53-142	7.34	30	
Perfluorooctanesulfonamide (FOSA)	10.8	1.8	ng/L	9.12		118		67-137	4.06	30	
Perfluorononanesulfonic acid (PFNS)	11.7	1.8	ng/L	8.76		**133**	*	69-127	28.3	30	L-01
Perfluoro-1-hexanesulfonamide (FHxSA)	10.1	1.8	ng/L	9.12		111		50-150	0.539	30	
Perfluoro-1-butanesulfonamide (FBSA)	10.7	1.8	ng/L	9.12		117		50-150	3.39	30	
Perfluorohexanesulfonic acid (PFHxS)	10.2	1.8	ng/L	8.34		122		68-131	5.58	30	
Perfluoro-4-oxapentanoic acid (PFMPA)	10.6	1.8	ng/L	9.12		116		53.8-150	2.59	30	
Perfluoro-5-oxahexanoic acid (PFMBA)	11.1	1.8	ng/L	9.12		122		54.5-152	0.592	30	
6:2 Fluorotelomersulfonic acid (6:2FTS A)	11.9	1.8	ng/L	8.66		137		64-140	0.348	30	
Perfluoropentanesulfonic acid (PFPeS)	10.8	1.8	ng/L	8.57		126		71-127	0.180	30	
Perfluoroundecanoic acid (PFUnA)	11.3	1.8	ng/L	9.12		124		69-133	0.793	30	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	10.1	1.8	ng/L	9.12		110		50.5-159	4.48	30	
Perfluoroheptanoic acid (PFHpA)	10.5	1.8	ng/L	9.12		115		72-130	0.460	30	
Perfluorooctanoic acid (PFOA)	12.1	1.8	ng/L	9.12		132		71-133	7.33	30	
Perfluorooctanesulfonic acid (PFOS)	10.9	1.8	ng/L	8.44		129		65-140	4.36	30	
Perfluorononanoic acid (PFNA)	11.1	1.8	ng/L	9.12		122		69-130	2.13	30	

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-01	Laboratory fortified blank/laboratory control sample recovery outside of control limits. Data validation is not affected since all results are "not detected" for all samples in this batch for this compound and bias is on the high side.
L-02	Laboratory fortified blank/laboratory control sample recovery and duplicate recoveries outside of control limits. Data validation is not affected since all results are "not detected" for associated samples in this batch and bias is on the high side.
PF-17	Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.
PF-19	Sample re-analyzed at a dilution that was re-fortified with internal standard.
S-29	Extracted Internal Standard is outside of control limits.

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-I(S) (23L1211-01)			Lab File ID: 23L1211-01.d			Analyzed: 12/20/23 14:23			
M8FOSA	463270.2	3.9566	821,977.00	3.9566	56	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	62904.53	2.4804	228,021.00	2.496817	28	50 - 150	-0.0164	+/-0.50	*
M2PFTA	1326524	4.321567	2,190,084.00	4.329683	61	50 - 150	-0.0081	+/-0.50	
M2-8:2FTS	291426.9	3.786867	426,189.00	3.794833	68	50 - 150	-0.0080	+/-0.50	
MPFBA	536763.8	1.075083	866,915.00	1.075083	62	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	185366.1	2.81475	218,004.00	2.8393	85	50 - 150	-0.0246	+/-0.50	
M6PFDA	1275743	3.79535	1,844,299.00	3.79535	69	50 - 150	0.0000	+/-0.50	
M3PFBS	257195.2	1.878383	329,840.00	1.894967	78	50 - 150	-0.0166	+/-0.50	
M7PFUnA	1113566	3.93805	1,701,532.00	3.946033	65	50 - 150	-0.0080	+/-0.50	
M2-6:2FTS	991021.9	3.429317	170,229.00	3.429317	582	50 - 150	0.0000	+/-0.50	*
M5PFPeA	532536.8	1.7231	770,284.00	1.7231	69	50 - 150	0.0000	+/-0.50	
M5PFHxA	953714.5	2.564133	1,324,533.00	2.58055	72	50 - 150	-0.0164	+/-0.50	
M3PFHxS	150736.7	3.193817	192,516.00	3.193817	78	50 - 150	0.0000	+/-0.50	
M4PFHpA	948504.4	3.1627	1,285,304.00	3.1627	74	50 - 150	0.0000	+/-0.50	
M8PFOA	962814.5	3.437833	1,450,100.00	3.445833	66	50 - 150	-0.0080	+/-0.50	
M8PFOS	168148.9	3.636183	228,157.00	3.636183	74	50 - 150	0.0000	+/-0.50	
M9PFNA	997513.9	3.637217	1,403,264.00	3.637217	71	50 - 150	0.0000	+/-0.50	
MPFDoA	905054.6	4.08065	1,494,566.00	4.08065	61	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	189473.8	3.945517	339,024.00	3.945517	56	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	210223.7	3.873767	419,564.00	3.873767	50	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-I(M) (23L1211-02)			Lab File ID: 23L1211-02.d			Analyzed: 12/20/23 14:31			
M8FOSA	464249.3	3.9566	821,977.00	3.9566	56	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	62173.49	2.4804	228,021.00	2.496817	27	50 - 150	-0.0164	+/-0.50	*
M2PFTA	1251582	4.32155	2,190,084.00	4.329683	57	50 - 150	-0.0081	+/-0.50	
M2-8:2FTS	281420.1	3.786867	426,189.00	3.794833	66	50 - 150	-0.0080	+/-0.50	
MPFBA	519207.3	1.075083	866,915.00	1.075083	60	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	165138.8	2.81475	218,004.00	2.8393	76	50 - 150	-0.0246	+/-0.50	
M6PFDA	1190799	3.787383	1,844,299.00	3.79535	65	50 - 150	-0.0080	+/-0.50	
M3PFBS	229097.9	1.878383	329,840.00	1.894967	69	50 - 150	-0.0166	+/-0.50	
M7PFUnA	1129378	3.93805	1,701,532.00	3.946033	66	50 - 150	-0.0080	+/-0.50	
M2-6:2FTS	72206.48	3.4293	170,229.00	3.429317	42	50 - 150	0.0000	+/-0.50	*
M5PFPeA	514616.3	1.714833	770,284.00	1.7231	67	50 - 150	-0.0083	+/-0.50	
M5PFHxA	890184.9	2.555917	1,324,533.00	2.58055	67	50 - 150	-0.0246	+/-0.50	
M3PFHxS	139954.4	3.185733	192,516.00	3.193817	73	50 - 150	-0.0081	+/-0.50	
M4PFHpA	886071.4	3.154633	1,285,304.00	3.1627	69	50 - 150	-0.0081	+/-0.50	
M8PFOA	1018299	3.437833	1,450,100.00	3.445833	70	50 - 150	-0.0080	+/-0.50	
M8PFOS	154740.4	3.6282	228,157.00	3.636183	68	50 - 150	-0.0080	+/-0.50	
M9PFNA	993050.7	3.629233	1,403,264.00	3.637217	71	50 - 150	-0.0080	+/-0.50	
MPFDoA	893333.9	4.08065	1,494,566.00	4.08065	60	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	187411.1	3.937517	339,024.00	3.945517	55	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	221842.7	3.865617	419,564.00	3.873767	53	50 - 150	-0.0082	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-I(D) (23L1211-03)			Lab File ID: 23L1211-03.d			Analyzed: 12/20/23 15:07			
M8FOSA	462277.7	3.9566	821,977.00	3.9566	56	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	60904.13	2.496817	228,021.00	2.4886	27	50 - 150	0.0082	+/-0.50	*
M2PFTA	1188155	4.32155	2,190,084.00	4.32155	54	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	228856.4	3.786867	426,189.00	3.786867	54	50 - 150	0.0000	+/-0.50	
MPFBA	517497.3	1.075083	866,915.00	1.075083	60	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	189752.8	2.831117	218,004.00	2.822933	87	50 - 150	0.0082	+/-0.50	
M6PFDA	1225098	3.79535	1,844,299.00	3.79535	66	50 - 150	0.0000	+/-0.50	
M3PFBS	255724.9	1.894967	329,840.00	1.886683	78	50 - 150	0.0083	+/-0.50	
M7PFUnA	891763	3.938033	1,701,532.00	3.93805	52	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	77468.52	3.4293	170,229.00	3.4293	46	50 - 150	0.0000	+/-0.50	*
M5PFPeA	551952.7	1.731383	770,284.00	1.7231	72	50 - 150	0.0083	+/-0.50	
M5PFHxA	966177.1	2.58055	1,324,533.00	2.572333	73	50 - 150	0.0082	+/-0.50	
M3PFHxS	150190.8	3.193817	192,516.00	3.193817	78	50 - 150	0.0000	+/-0.50	
M4PFHpA	967674.6	3.1627	1,285,304.00	3.1627	75	50 - 150	0.0000	+/-0.50	
M8PFOA	1104364	3.445833	1,450,100.00	3.437833	76	50 - 150	0.0080	+/-0.50	
M8PFOS	169840.1	3.636183	228,157.00	3.636183	74	50 - 150	0.0000	+/-0.50	
M9PFNA	1033511	3.637217	1,403,264.00	3.637217	74	50 - 150	0.0000	+/-0.50	
MPFDoA	855756.1	4.08065	1,494,566.00	4.08065	57	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	150711.5	3.945517	339,024.00	3.945517	44	50 - 150	0.0000	+/-0.50	*
D3-NMeFOSAA	201933.6	3.865617	419,564.00	3.865617	48	50 - 150	0.0000	+/-0.50	*

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-P(S) (23L1211-04)			Lab File ID: 23L1211-04.d			Analyzed: 12/20/23 15:14			
M8FOSA	509573.8	3.9566	821,977.00	3.9566	62	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	66231.33	2.4886	228,021.00	2.4886	29	50 - 150	0.0000	+/-0.50	*
M2PFTA	1342759	4.32155	2,190,084.00	4.32155	61	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	314348	3.78685	426,189.00	3.786867	74	50 - 150	0.0000	+/-0.50	
MPFBA	575390.1	1.075083	866,915.00	1.075083	66	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	167277.5	2.831117	218,004.00	2.822933	77	50 - 150	0.0082	+/-0.50	
M6PFDA	1403788	3.79535	1,844,299.00	3.79535	76	50 - 150	0.0000	+/-0.50	
M3PFBS	263766.9	1.886667	329,840.00	1.886683	80	50 - 150	0.0000	+/-0.50	
M7PFUnA	1062980	3.938033	1,701,532.00	3.93805	62	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	85348.72	3.4293	170,229.00	3.4293	50	50 - 150	0.0000	+/-0.50	
M5PFPeA	568175.6	1.7231	770,284.00	1.7231	74	50 - 150	0.0000	+/-0.50	
M5PFHxA	976009.8	2.572333	1,324,533.00	2.572333	74	50 - 150	0.0000	+/-0.50	
M3PFHxS	155146.5	3.193817	192,516.00	3.193817	81	50 - 150	0.0000	+/-0.50	
M4PFHpA	981997.8	3.1627	1,285,304.00	3.1627	76	50 - 150	0.0000	+/-0.50	
M8PFOA	1115158	3.445833	1,450,100.00	3.437833	77	50 - 150	0.0080	+/-0.50	
M8PFOS	179229.1	3.636183	228,157.00	3.636183	79	50 - 150	0.0000	+/-0.50	
M9PFNA	1078889	3.637217	1,403,264.00	3.637217	77	50 - 150	0.0000	+/-0.50	
MPFDoA	924448.1	4.08065	1,494,566.00	4.08065	62	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	203626.7	3.945517	339,024.00	3.945517	60	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	273685.7	3.865617	419,564.00	3.865617	65	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-P(M) (23L1211-05)			Lab File ID: 23L1211-05.d			Analyzed: 12/20/23 15:22			
M8FOSA	411943.3	3.9566	821,977.00	3.9566	50	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	67788.56	2.4886	228,021.00	2.4886	30	50 - 150	0.0000	+/-0.50	*
M2PFTA	1240170	4.32155	2,190,084.00	4.32155	57	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	287215.1	3.786867	426,189.00	3.786867	67	50 - 150	0.0000	+/-0.50	
MPFBA	519686.1	1.075083	866,915.00	1.075083	60	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	194448.2	2.822933	218,004.00	2.822933	89	50 - 150	0.0000	+/-0.50	
M6PFDA	1282929	3.787383	1,844,299.00	3.79535	70	50 - 150	-0.0080	+/-0.50	
M3PFBS	250397	1.886683	329,840.00	1.886683	76	50 - 150	0.0000	+/-0.50	
M7PFUnA	1221857	3.938033	1,701,532.00	3.93805	72	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	100662.7	3.429317	170,229.00	3.4293	59	50 - 150	0.0000	+/-0.50	
M5PFPeA	547576.1	1.7231	770,284.00	1.7231	71	50 - 150	0.0000	+/-0.50	
M5PFHxA	946278.3	2.572333	1,324,533.00	2.572333	71	50 - 150	0.0000	+/-0.50	
M3PFHxS	142625.1	3.193817	192,516.00	3.193817	74	50 - 150	0.0000	+/-0.50	
M4PFHpA	937358.5	3.1627	1,285,304.00	3.1627	73	50 - 150	0.0000	+/-0.50	
M8PFOA	1099577	3.437833	1,450,100.00	3.437833	76	50 - 150	0.0000	+/-0.50	
M8PFOS	175072.7	3.636183	228,157.00	3.636183	77	50 - 150	0.0000	+/-0.50	
M9PFNA	1072001	3.637217	1,403,264.00	3.637217	76	50 - 150	0.0000	+/-0.50	
MPFDoA	882426.8	4.08065	1,494,566.00	4.08065	59	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	182447.8	3.945517	339,024.00	3.945517	54	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	239943.2	3.865617	419,564.00	3.865617	57	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-3 (23L1211-06)			Lab File ID: 23L1211-06.d			Analyzed: 12/20/23 15:29			
M8FOSA	472977.6	3.9566	821,977.00	3.9566	58	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	75876.34	2.4886	228,021.00	2.4886	33	50 - 150	0.0000	+/-0.50	*
M2PFTA	1204922	4.32155	2,190,084.00	4.32155	55	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	267703.3	3.786867	426,189.00	3.786867	63	50 - 150	0.0000	+/-0.50	
MPFBA	453977.4	1.075083	866,915.00	1.075083	52	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	181011	2.822933	218,004.00	2.822933	83	50 - 150	0.0000	+/-0.50	
M6PFDA	1255178	3.79535	1,844,299.00	3.79535	68	50 - 150	0.0000	+/-0.50	
M3PFBS	250711.2	1.886683	329,840.00	1.886683	76	50 - 150	0.0000	+/-0.50	
M7PFUnA	996653.7	3.93805	1,701,532.00	3.93805	59	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	124645.5	3.429317	170,229.00	3.4293	73	50 - 150	0.0000	+/-0.50	
M5PFPeA	530864.4	1.7231	770,284.00	1.7231	69	50 - 150	0.0000	+/-0.50	
M5PFHxA	931596.9	2.572333	1,324,533.00	2.572333	70	50 - 150	0.0000	+/-0.50	
M3PFHxS	145464.4	3.193817	192,516.00	3.193817	76	50 - 150	0.0000	+/-0.50	
M4PFHpA	935062.1	3.1627	1,285,304.00	3.1627	73	50 - 150	0.0000	+/-0.50	
M8PFOA	1053201	3.437833	1,450,100.00	3.437833	73	50 - 150	0.0000	+/-0.50	
M8PFOS	171706.3	3.636183	228,157.00	3.636183	75	50 - 150	0.0000	+/-0.50	
M9PFNA	1001043	3.637217	1,403,264.00	3.637217	71	50 - 150	0.0000	+/-0.50	
MPFDoA	858206.8	4.08065	1,494,566.00	4.08065	57	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	192552.1	3.945517	339,024.00	3.945517	57	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	246428.8	3.865617	419,564.00	3.865617	59	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-302 (23L1211-07)			Lab File ID: 23L1211-07.d			Analyzed: 12/20/23 15:36			
M8FOSA	449284.4	3.9566	821,977.00	3.9566	55	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	54681.99	2.496817	228,021.00	2.4886	24	50 - 150	0.0082	+/-0.50	*
M2PFTA	1061947	4.32155	2,190,084.00	4.32155	48	50 - 150	0.0000	+/-0.50	*
M2-8:2FTS	198172.1	3.786867	426,189.00	3.786867	46	50 - 150	0.0000	+/-0.50	*
MPFBA	583669.1	1.075083	866,915.00	1.075083	67	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	178422.5	2.831117	218,004.00	2.822933	82	50 - 150	0.0082	+/-0.50	
M6PFDA	1151847	3.79535	1,844,299.00	3.79535	62	50 - 150	0.0000	+/-0.50	
M3PFBS	254547.7	1.886667	329,840.00	1.886683	77	50 - 150	0.0000	+/-0.50	
M7PFUnA	800728.9	3.938033	1,701,532.00	3.93805	47	50 - 150	0.0000	+/-0.50	*
M2-6:2FTS	74254.66	3.4293	170,229.00	3.4293	44	50 - 150	0.0000	+/-0.50	*
M5PFPeA	562580.6	1.7231	770,284.00	1.7231	73	50 - 150	0.0000	+/-0.50	
M5PFHxA	965793.8	2.58055	1,324,533.00	2.572333	73	50 - 150	0.0082	+/-0.50	
M3PFHxS	153697.5	3.193817	192,516.00	3.193817	80	50 - 150	0.0000	+/-0.50	
M4PFHpA	974684.1	3.1627	1,285,304.00	3.1627	76	50 - 150	0.0000	+/-0.50	
M8PFOA	1076678	3.445833	1,450,100.00	3.437833	74	50 - 150	0.0080	+/-0.50	
M8PFOS	157981.7	3.636183	228,157.00	3.636183	69	50 - 150	0.0000	+/-0.50	
M9PFNA	1002055	3.637217	1,403,264.00	3.637217	71	50 - 150	0.0000	+/-0.50	
MPFDoA	655959.2	4.08065	1,494,566.00	4.08065	44	50 - 150	0.0000	+/-0.50	*
D5-NEtFOSAA	122594	3.945517	339,024.00	3.945517	36	50 - 150	0.0000	+/-0.50	*
D3-NMeFOSAA	167463.5	3.865617	419,564.00	3.865617	40	50 - 150	0.0000	+/-0.50	*

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW--S(S) (23L1211-08)			Lab File ID: 23L1211-08.d			Analyzed: 12/20/23 15:43			
M8FOSA	420042.5	3.9566	821,977.00	3.9566	51	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	54832.82	2.496817	228,021.00	2.4886	24	50 - 150	0.0082	+/-0.50	*
M2PFTA	1064026	4.32155	2,190,084.00	4.32155	49	50 - 150	0.0000	+/-0.50	*
M2-8:2FTS	217749.7	3.786867	426,189.00	3.786867	51	50 - 150	0.0000	+/-0.50	
MPFBA	511187.4	1.075083	866,915.00	1.075083	59	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	184491.7	2.822933	218,004.00	2.822933	85	50 - 150	0.0000	+/-0.50	
M6PFDA	1194872	3.787383	1,844,299.00	3.79535	65	50 - 150	-0.0080	+/-0.50	
M3PFBS	253028.1	1.886683	329,840.00	1.886683	77	50 - 150	0.0000	+/-0.50	
M7PFUnA	957013.4	3.93805	1,701,532.00	3.93805	56	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	718948.9	3.429317	170,229.00	3.4293	422	50 - 150	0.0000	+/-0.50	*
M5PFPeA	523406.1	1.7231	770,284.00	1.7231	68	50 - 150	0.0000	+/-0.50	
M5PFHxA	926596.9	2.572333	1,324,533.00	2.572333	70	50 - 150	0.0000	+/-0.50	
M3PFHxS	145386.7	3.193817	192,516.00	3.193817	76	50 - 150	0.0000	+/-0.50	
M4PFHpA	915287.3	3.1627	1,285,304.00	3.1627	71	50 - 150	0.0000	+/-0.50	
M8PFOA	949649.6	3.437833	1,450,100.00	3.437833	65	50 - 150	0.0000	+/-0.50	
M8PFOS	158663.3	3.636183	228,157.00	3.636183	70	50 - 150	0.0000	+/-0.50	
M9PFNA	931227.8	3.637217	1,403,264.00	3.637217	66	50 - 150	0.0000	+/-0.50	
MPFDoA	805107.4	4.08065	1,494,566.00	4.08065	54	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	131276.1	3.945517	339,024.00	3.945517	39	50 - 150	0.0000	+/-0.50	*
D3-NMeFOSAA	157168.3	3.865617	419,564.00	3.865617	37	50 - 150	0.0000	+/-0.50	*
HW--S(S) (23L1211-08RE1)			Lab File ID: 23L1211-08RE1.d			Analyzed: 12/21/23 13:45			
M5PFPeA	655666.7	1.757717	851,514.00	1.757717	77	50 - 150	0.0000	+/-0.50	
M8PFOS	225406.1	3.636183	295,085.00	3.636183	76	50 - 150	0.0000	+/-0.50	
HW--S(S) (23L1211-08RE2)			Lab File ID: 23L1211-08RE2.d			Analyzed: 12/21/23 14:44			
M2-6:2FTS	121604.8	3.445283	155,055.00	3.445283	78	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW--S(M) (23L1211-09)			Lab File ID: 23L1211-09.d			Analyzed: 12/20/23 15:51			
M8FOSA	433014.2	3.9566	821,977.00	3.9566	53	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	63356.71	2.4886	228,021.00	2.4886	28	50 - 150	0.0000	+/-0.50	*
M2PFTA	1117269	4.32155	2,190,084.00	4.32155	51	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	235288.6	3.78685	426,189.00	3.786867	55	50 - 150	0.0000	+/-0.50	
MPFBA	542559.1	1.075083	866,915.00	1.075083	63	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	182660	2.822933	218,004.00	2.822933	84	50 - 150	0.0000	+/-0.50	
M6PFDA	1140514	3.79535	1,844,299.00	3.79535	62	50 - 150	0.0000	+/-0.50	
M3PFBS	219247.7	1.886667	329,840.00	1.886683	66	50 - 150	0.0000	+/-0.50	
M7PFUnA	998922.2	3.938033	1,701,532.00	3.93805	59	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	72610.51	3.4293	170,229.00	3.4293	43	50 - 150	0.0000	+/-0.50	*
M5PFPeA	522252.4	1.7231	770,284.00	1.7231	68	50 - 150	0.0000	+/-0.50	
M5PFHxA	861863.6	2.572333	1,324,533.00	2.572333	65	50 - 150	0.0000	+/-0.50	
M3PFHxS	124475.7	3.193817	192,516.00	3.193817	65	50 - 150	0.0000	+/-0.50	
M4PFHpA	851350.1	3.1627	1,285,304.00	3.1627	66	50 - 150	0.0000	+/-0.50	
M8PFOA	941892.6	3.437833	1,450,100.00	3.437833	65	50 - 150	0.0000	+/-0.50	
M8PFOS	146634.2	3.636183	228,157.00	3.636183	64	50 - 150	0.0000	+/-0.50	
M9PFNA	860693.1	3.637217	1,403,264.00	3.637217	61	50 - 150	0.0000	+/-0.50	
MPFDoA	822533.6	4.08065	1,494,566.00	4.08065	55	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	154953.4	3.945517	339,024.00	3.945517	46	50 - 150	0.0000	+/-0.50	*
D3-NMeFOSAA	179618.4	3.873767	419,564.00	3.865617	43	50 - 150	0.0082	+/-0.50	*

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
ME-1 (23L1211-10)			Lab File ID: 23L1211-10.d			Analyzed: 12/20/23 15:58			
M8FOSA	427133.9	3.9566	821,977.00	3.9566	52	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	54895.25	2.4886	228,021.00	2.4886	24	50 - 150	0.0000	+/-0.50	*
M2PFTA	1137290	4.32155	2,190,084.00	4.32155	52	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	206108.3	3.786867	426,189.00	3.786867	48	50 - 150	0.0000	+/-0.50	*
MPFBA	544624.4	1.075083	866,915.00	1.075083	63	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	212588.5	2.831117	218,004.00	2.822933	98	50 - 150	0.0082	+/-0.50	
M6PFDA	1209469	3.79535	1,844,299.00	3.79535	66	50 - 150	0.0000	+/-0.50	
M3PFBS	267435.5	1.886667	329,840.00	1.886683	81	50 - 150	0.0000	+/-0.50	
M7PFUnA	816585.1	3.93805	1,701,532.00	3.93805	48	50 - 150	0.0000	+/-0.50	*
M2-6:2FTS	78333.41	3.429317	170,229.00	3.4293	46	50 - 150	0.0000	+/-0.50	*
M5PFPeA	559957.8	1.7231	770,284.00	1.7231	73	50 - 150	0.0000	+/-0.50	
M5PFHxA	993301.9	2.58055	1,324,533.00	2.572333	75	50 - 150	0.0082	+/-0.50	
M3PFHxS	153331.2	3.193817	192,516.00	3.193817	80	50 - 150	0.0000	+/-0.50	
M4PFHpA	994327.5	3.1627	1,285,304.00	3.1627	77	50 - 150	0.0000	+/-0.50	
M8PFOA	1171672	3.445833	1,450,100.00	3.437833	81	50 - 150	0.0080	+/-0.50	
M8PFOS	161827.5	3.636183	228,157.00	3.636183	71	50 - 150	0.0000	+/-0.50	
M9PFNA	1034256	3.637217	1,403,264.00	3.637217	74	50 - 150	0.0000	+/-0.50	
MPFDoA	688761.8	4.08065	1,494,566.00	4.08065	46	50 - 150	0.0000	+/-0.50	*
D5-NEtFOSAA	143512.7	3.945517	339,024.00	3.945517	42	50 - 150	0.0000	+/-0.50	*
D3-NMeFOSAA	186319.1	3.865617	419,564.00	3.865617	44	50 - 150	0.0000	+/-0.50	*

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
ME-2 (23L1211-11)			Lab File ID: 23L1211-11.d			Analyzed: 12/20/23 16:05			
M8FOSA	490380	3.9566	821,977.00	3.9566	60	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	56782.08	2.4886	228,021.00	2.4886	25	50 - 150	0.0000	+/-0.50	*
M2PFTA	1355333	4.32155	2,190,084.00	4.32155	62	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	227222	3.786867	426,189.00	3.786867	53	50 - 150	0.0000	+/-0.50	
MPFBA	560998.1	1.075083	866,915.00	1.075083	65	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	190025.4	2.831117	218,004.00	2.822933	87	50 - 150	0.0082	+/-0.50	
M6PFDA	1418127	3.79535	1,844,299.00	3.79535	77	50 - 150	0.0000	+/-0.50	
M3PFBS	272403.2	1.886667	329,840.00	1.886683	83	50 - 150	0.0000	+/-0.50	
M7PFUnA	1024300	3.93805	1,701,532.00	3.93805	60	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	90094.32	3.429317	170,229.00	3.4293	53	50 - 150	0.0000	+/-0.50	
M5PFPeA	582025.6	1.7231	770,284.00	1.7231	76	50 - 150	0.0000	+/-0.50	
M5PFHxA	1024335	2.58055	1,324,533.00	2.572333	77	50 - 150	0.0082	+/-0.50	
M3PFHxS	156808.8	3.193817	192,516.00	3.193817	81	50 - 150	0.0000	+/-0.50	
M4PFHpA	1008153	3.1627	1,285,304.00	3.1627	78	50 - 150	0.0000	+/-0.50	
M8PFOA	1196874	3.445833	1,450,100.00	3.437833	83	50 - 150	0.0080	+/-0.50	
M8PFOS	174874.8	3.636183	228,157.00	3.636183	77	50 - 150	0.0000	+/-0.50	
M9PFNA	1073064	3.637217	1,403,264.00	3.637217	76	50 - 150	0.0000	+/-0.50	
MPFDoA	862743.3	4.08065	1,494,566.00	4.08065	58	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	200490.3	3.945517	339,024.00	3.945517	59	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	264670.4	3.865617	419,564.00	3.865617	63	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
ME-3 (23L1211-12)			Lab File ID: 23L1211-12.d			Analyzed: 01/02/24 12:08			
M8FOSA	450414.8	4.00455	766,294.00	3.99655	59	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	92028.63	2.644867	256,494.00	2.644867	36	50 - 150	0.0000	+/-0.50	*
M2PFTA	1185256	4.362167	2,101,978.00	4.362167	56	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	95473.79	3.82705	209,493.00	3.82705	46	50 - 150	0.0000	+/-0.50	*
MPFBA	518848.9	1.100017	884,750.00	1.0917	59	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	210075.3	2.937833	276,915.00	2.937833	76	50 - 150	0.0000	+/-0.50	
M6PFDA	901650.9	3.82755	1,372,130.00	3.82755	66	50 - 150	0.0000	+/-0.50	
M3PFBS	262579.8	2.011067	372,281.00	2.011067	71	50 - 150	0.0000	+/-0.50	
M7PFUnA	989501.6	3.978	1,689,139.00	3.978	59	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	119701.5	3.469383	174,608.00	3.477367	69	50 - 150	-0.0080	+/-0.50	
M5PFPeA	538465.1	1.824517	803,514.00	1.816233	67	50 - 150	0.0083	+/-0.50	
M5PFHxA	975605.3	2.730867	1,443,773.00	2.730867	68	50 - 150	0.0000	+/-0.50	
M3PFHxS	166842.1	3.250667	231,194.00	3.250667	72	50 - 150	0.0000	+/-0.50	
M4PFHpA	1000295	3.227617	1,481,981.00	3.227617	67	50 - 150	0.0000	+/-0.50	
M8PFOA	1099237	3.485883	1,525,826.00	3.485883	72	50 - 150	0.0000	+/-0.50	
M8PFOS	164137.2	3.668117	243,805.00	3.668117	67	50 - 150	0.0000	+/-0.50	
M9PFNA	998280.8	3.66915	1,341,664.00	3.66915	74	50 - 150	0.0000	+/-0.50	
MPFDoA	968659.9	4.120767	1,700,937.00	4.120767	57	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	231634.1	3.985467	413,957.00	3.985467	56	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	255231.5	3.9059	494,834.00	3.9059	52	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B361025-BLK1)			Lab File ID: B361025-BLK1.d			Analyzed: 12/20/23 13:33			
M8FOSA	628576.7	3.964583	821,977.00	3.9566	76	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	190048.4	2.505033	228,021.00	2.496817	83	50 - 150	0.0082	+/-0.50	
M2PFTA	1611991	4.329683	2,190,084.00	4.329683	74	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	457246	3.794833	426,189.00	3.794833	107	50 - 150	0.0000	+/-0.50	
MPFBA	674140.7	1.075083	866,915.00	1.075083	78	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	202862.1	2.831117	218,004.00	2.8393	93	50 - 150	-0.0082	+/-0.50	
M6PFDA	1519480	3.79535	1,844,299.00	3.79535	82	50 - 150	0.0000	+/-0.50	
M3PFBS	274348.3	1.894967	329,840.00	1.894967	83	50 - 150	0.0000	+/-0.50	
M7PFUnA	1279714	3.946033	1,701,532.00	3.946033	75	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	157058.5	3.4373	170,229.00	3.429317	92	50 - 150	0.0080	+/-0.50	
M5PFPeA	624570.2	1.731383	770,284.00	1.7231	81	50 - 150	0.0083	+/-0.50	
M5PFHxA	1088003	2.588767	1,324,533.00	2.58055	82	50 - 150	0.0082	+/-0.50	
M3PFHxS	169760	3.201883	192,516.00	3.193817	88	50 - 150	0.0081	+/-0.50	
M4PFHpA	1113443	3.170783	1,285,304.00	3.1627	87	50 - 150	0.0081	+/-0.50	
M8PFOA	1315735	3.445833	1,450,100.00	3.445833	91	50 - 150	0.0000	+/-0.50	
M8PFOS	190868.2	3.636183	228,157.00	3.636183	84	50 - 150	0.0000	+/-0.50	
M9PFNA	1264270	3.637217	1,403,264.00	3.637217	90	50 - 150	0.0000	+/-0.50	
MPFDoA	1109098	4.08865	1,494,566.00	4.08065	74	50 - 150	0.0080	+/-0.50	
D5-NEtFOSAA	260160.9	3.9535	339,024.00	3.945517	77	50 - 150	0.0080	+/-0.50	
D3-NMeFOSAA	358518.7	3.873767	419,564.00	3.873767	85	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B361025-BS1)			Lab File ID: B361025-BS1.d			Analyzed: 12/20/23 13:18			
M8FOSA	639083.4	3.9566	821,977.00	3.9566	78	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	205118.6	2.496817	228,021.00	2.496817	90	50 - 150	0.0000	+/-0.50	
M2PFTA	1651785	4.32155	2,190,084.00	4.329683	75	50 - 150	-0.0081	+/-0.50	
M2-8:2FTS	536812.2	3.794833	426,189.00	3.794833	126	50 - 150	0.0000	+/-0.50	
MPFBA	725384.1	1.075083	866,915.00	1.075083	84	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	247274.2	2.831117	218,004.00	2.8393	113	50 - 150	-0.0082	+/-0.50	
M6PFDA	1596528	3.79535	1,844,299.00	3.79535	87	50 - 150	0.0000	+/-0.50	
M3PFBS	293228.3	1.886667	329,840.00	1.894967	89	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1325192	3.93805	1,701,532.00	3.946033	78	50 - 150	-0.0080	+/-0.50	
M2-6:2FTS	165660.4	3.4293	170,229.00	3.429317	97	50 - 150	0.0000	+/-0.50	
M5PFPeA	668087.1	1.7231	770,284.00	1.7231	87	50 - 150	0.0000	+/-0.50	
M5PFHxA	1153284	2.58055	1,324,533.00	2.58055	87	50 - 150	0.0000	+/-0.50	
M3PFHxS	179742.9	3.193817	192,516.00	3.193817	93	50 - 150	0.0000	+/-0.50	
M4PFHpA	1160738	3.1627	1,285,304.00	3.1627	90	50 - 150	0.0000	+/-0.50	
M8PFOA	1348348	3.445833	1,450,100.00	3.445833	93	50 - 150	0.0000	+/-0.50	
M8PFOS	196466.4	3.636183	228,157.00	3.636183	86	50 - 150	0.0000	+/-0.50	
M9PFNA	1280663	3.637217	1,403,264.00	3.637217	91	50 - 150	0.0000	+/-0.50	
MPFDoA	1128930	4.08065	1,494,566.00	4.08065	76	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	280918.9	3.945517	339,024.00	3.945517	83	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	368520.5	3.865617	419,564.00	3.873767	88	50 - 150	-0.0082	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS Dup (B361025-BSD1)			Lab File ID: B361025-BSD1.d			Analyzed: 12/20/23 13:26			
M8FOSA	665667.1	3.964583	821,977.00	3.9566	81	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	229504.7	2.505033	228,021.00	2.496817	101	50 - 150	0.0082	+/-0.50	
M2PFTA	1873515	4.329683	2,190,084.00	4.329683	86	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	573174.6	3.794833	426,189.00	3.794833	134	50 - 150	0.0000	+/-0.50	
MPFBA	758255.4	1.075083	866,915.00	1.075083	87	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	237271.7	2.8393	218,004.00	2.8393	109	50 - 150	0.0000	+/-0.50	
M6PFDA	1762897	3.79535	1,844,299.00	3.79535	96	50 - 150	0.0000	+/-0.50	
M3PFBS	329697.9	1.894967	329,840.00	1.894967	100	50 - 150	0.0000	+/-0.50	
M7PFUnA	1531161	3.946033	1,701,532.00	3.946033	90	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	188275.3	3.4373	170,229.00	3.429317	111	50 - 150	0.0080	+/-0.50	
M5PFPeA	706437.5	1.731383	770,284.00	1.7231	92	50 - 150	0.0083	+/-0.50	
M5PFHxA	1251322	2.588767	1,324,533.00	2.58055	94	50 - 150	0.0082	+/-0.50	
M3PFHxS	197890.1	3.201883	192,516.00	3.193817	103	50 - 150	0.0081	+/-0.50	
M4PFHpA	1283716	3.170783	1,285,304.00	3.1627	100	50 - 150	0.0081	+/-0.50	
M8PFOA	1506973	3.445833	1,450,100.00	3.445833	104	50 - 150	0.0000	+/-0.50	
M8PFOS	219852.4	3.636183	228,157.00	3.636183	96	50 - 150	0.0000	+/-0.50	
M9PFNA	1500780	3.637217	1,403,264.00	3.637217	107	50 - 150	0.0000	+/-0.50	
MPFDoA	1226190	4.08865	1,494,566.00	4.08065	82	50 - 150	0.0080	+/-0.50	
D5-NEtFOSAA	311707.4	3.9535	339,024.00	3.945517	92	50 - 150	0.0080	+/-0.50	
D3-NMeFOSAA	390538.3	3.873767	419,564.00	3.873767	93	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B361067-BLK1)			Lab File ID: B361067-BLK1.d			Analyzed: 12/28/23 21:47			
M8FOSA	581097.6	4.036533	917,199.00	4.036533	63	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	186744.7	2.62	344,794.00	2.62	54	50 - 150	0.0000	+/-0.50	
M2PFTA	1202198	4.35405	1,825,146.00	4.35405	66	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	243284.5	3.835017	325,660.00	3.835017	75	50 - 150	0.0000	+/-0.50	
MPFBA	677262	1.0917	973,516.00	1.0917	70	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	230914.5	2.929717	303,808.00	2.921133	76	50 - 150	0.0086	+/-0.50	
M6PFDA	1165586	3.8355	1,678,611.00	3.82755	69	50 - 150	0.0080	+/-0.50	
M3PFBS	294337.2	1.986217	421,258.00	1.986217	70	50 - 150	0.0000	+/-0.50	
M7PFUnA	1103658	3.978017	1,844,773.00	3.978017	60	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	193335.1	3.48535	246,266.00	3.48535	79	50 - 150	0.0000	+/-0.50	
M5PFPeA	624963.4	1.799667	846,062.00	1.799667	74	50 - 150	0.0000	+/-0.50	
M5PFHxA	1114600	2.706317	1,533,051.00	2.706317	73	50 - 150	0.0000	+/-0.50	
M3PFHxS	170427.4	3.266833	245,975.00	3.25875	69	50 - 150	0.0081	+/-0.50	
M4PFHpA	1151061	3.2357	1,550,063.00	3.2357	74	50 - 150	0.0000	+/-0.50	
M8PFOA	1330943	3.493867	1,635,755.00	3.493867	81	50 - 150	0.0000	+/-0.50	
M8PFOS	174737.5	3.676117	258,464.00	3.676117	68	50 - 150	0.0000	+/-0.50	
M9PFNA	1081554	3.67715	1,495,942.00	3.67715	72	50 - 150	0.0000	+/-0.50	
MPFDoA	1005416	4.112633	1,727,274.00	4.112633	58	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	275236.6	3.985483	450,264.00	3.985483	61	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	345813	3.9059	520,003.00	3.9059	67	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B361067-BS1)			Lab File ID: B361067-BS1.d			Analyzed: 12/28/23 21:33			
M8FOSA	462877.2	4.036533	917,199.00	4.036533	50	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	157811.2	2.62	344,794.00	2.62	46	50 - 150	0.0000	+/-0.50	*
M2PFTA	1033471	4.35405	1,825,146.00	4.35405	57	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	184635.3	3.835017	325,660.00	3.835017	57	50 - 150	0.0000	+/-0.50	
MPFBA	576188.5	1.100017	973,516.00	1.0917	59	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	196347.1	2.929717	303,808.00	2.921133	65	50 - 150	0.0086	+/-0.50	
M6PFDA	984374.8	3.8355	1,678,611.00	3.82755	59	50 - 150	0.0080	+/-0.50	
M3PFBS	254455.5	1.986217	421,258.00	1.986217	60	50 - 150	0.0000	+/-0.50	
M7PFUnA	928224.9	3.978017	1,844,773.00	3.978017	50	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	158132.4	3.48535	246,266.00	3.48535	64	50 - 150	0.0000	+/-0.50	
M5PFPeA	533464.2	1.799667	846,062.00	1.799667	63	50 - 150	0.0000	+/-0.50	
M5PFHxA	954248.5	2.7145	1,533,051.00	2.706317	62	50 - 150	0.0082	+/-0.50	
M3PFHxS	140507.4	3.266833	245,975.00	3.25875	57	50 - 150	0.0081	+/-0.50	
M4PFHpA	954176.6	3.2357	1,550,063.00	3.2357	62	50 - 150	0.0000	+/-0.50	
M8PFOA	1084792	3.493867	1,635,755.00	3.493867	66	50 - 150	0.0000	+/-0.50	
M8PFOS	151940.6	3.676117	258,464.00	3.676117	59	50 - 150	0.0000	+/-0.50	
M9PFNA	913978.8	3.67715	1,495,942.00	3.67715	61	50 - 150	0.0000	+/-0.50	
MPFDoA	875322.9	4.112633	1,727,274.00	4.112633	51	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	249789.2	3.985483	450,264.00	3.985483	55	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	282457.7	3.9059	520,003.00	3.9059	54	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS Dup (B361067-BSD1)			Lab File ID: B361067-BSD1.d			Analyzed: 12/28/23 21:40			
M8FOSA	514454.5	4.036533	917,199.00	4.036533	56	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	170160.5	2.62	344,794.00	2.62	49	50 - 150	0.0000	+/-0.50	*
M2PFTA	1141424	4.345933	1,825,146.00	4.35405	63	50 - 150	-0.0081	+/-0.50	
M2-8:2FTS	207282.5	3.835017	325,660.00	3.835017	64	50 - 150	0.0000	+/-0.50	
MPFBA	615521.4	1.0917	973,516.00	1.0917	63	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	211255.3	2.929717	303,808.00	2.921133	70	50 - 150	0.0086	+/-0.50	
M6PFDA	1045449	3.8355	1,678,611.00	3.82755	62	50 - 150	0.0080	+/-0.50	
M3PFBS	264352.8	1.986217	421,258.00	1.986217	63	50 - 150	0.0000	+/-0.50	
M7PFUnA	1096342	3.978017	1,844,773.00	3.978017	59	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	177137.7	3.48535	246,266.00	3.48535	72	50 - 150	0.0000	+/-0.50	
M5PFPeA	568139.6	1.799667	846,062.00	1.799667	67	50 - 150	0.0000	+/-0.50	
M5PFHxA	990086.8	2.706317	1,533,051.00	2.706317	65	50 - 150	0.0000	+/-0.50	
M3PFHxS	152599.2	3.266833	245,975.00	3.25875	62	50 - 150	0.0081	+/-0.50	
M4PFHpA	1032255	3.2357	1,550,063.00	3.2357	67	50 - 150	0.0000	+/-0.50	
M8PFOA	1126134	3.493867	1,635,755.00	3.493867	69	50 - 150	0.0000	+/-0.50	
M8PFOS	143775.2	3.676117	258,464.00	3.676117	56	50 - 150	0.0000	+/-0.50	
M9PFNA	973770.9	3.67715	1,495,942.00	3.67715	65	50 - 150	0.0000	+/-0.50	
MPFDoA	939403.9	4.112633	1,727,274.00	4.112633	54	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	262717.8	3.985483	450,264.00	3.985483	58	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	326695.5	3.9059	520,003.00	3.9059	63	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Resolution Check (S098170-RES1)			Lab File ID: BIC1_ID_122123.d			Analyzed: 12/21/23 13:12			
M8FOSA				3.972583		50 - 150	-3.9726	+/-0.50	*
M2-4:2FTS				2.562517		50 - 150	-2.5625	+/-0.50	*
M2PFTA				4.329683		50 - 150	-4.3297	+/-0.50	*
M2-8:2FTS				3.8028		50 - 150	-3.8028	+/-0.50	*
MPFBA				1.058467		50 - 150	-1.0585	+/-0.50	*
M3HFPO-DA				2.872033		50 - 150	-2.8720	+/-0.50	*
M6PFDA				3.79535		50 - 150	-3.7954	+/-0.50	*
M3PFBS				1.9364		50 - 150	-1.9364	+/-0.50	*
M7PFUnA				3.946033		50 - 150	-3.9460	+/-0.50	*
M2-6:2FTS				3.445283		50 - 150	-3.4453	+/-0.50	*
M5PFPeA				1.757717		50 - 150	-1.7577	+/-0.50	*
M5PFHxA				2.646767		50 - 150	-2.6468	+/-0.50	*
M3PFHxS				3.218333		50 - 150	-3.2183	+/-0.50	*
M4PFHpA				3.186933		50 - 150	-3.1869	+/-0.50	*
M8PFOA				3.453817		50 - 150	-3.4538	+/-0.50	*
M8PFOS				3.636183		50 - 150	-3.6362	+/-0.50	*
M9PFNA				3.6452		50 - 150	-3.6452	+/-0.50	*
MPFDoA				4.08865		50 - 150	-4.0887	+/-0.50	*
D5-NEtFOSAA	1658.416	3.905533		3.9535		50 - 150	-0.0480	+/-0.50	*
D3-NMeFOSAA	161.3761	3.897717		3.873767		50 - 150	0.0240	+/-0.50	*

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SOP-454 PFAS in Water	
Perfluorobutanoic acid (PFBA)	NH-P,PA,NY
Perfluorobutanesulfonic acid (PFBS)	NH-P,PA,NY
Perfluoropentanoic acid (PFPeA)	NH-P,PA,NY
Perfluorohexanoic acid (PFHxA)	NH-P,PA,NY
11Cl-PF3OUdS (F53B Major)	NH-P,PA,NY
9Cl-PF3ONS (F53B Minor)	NH-P,PA
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	NH-P,PA,NY
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P,PA,NY
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P,PA
Perfluorodecanoic acid (PFDA)	NH-P,PA,NY
Perfluorododecanoic acid (PFDoA)	NH-P,PA,NY
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	NH-P,PA,NY
Perfluoroheptanesulfonic acid (PFHpS)	NH-P,PA,NY
N-EtFOSAA (NEtFOSAA)	NH-P,PA,NY
N-MeFOSAA (NMeFOSAA)	NH-P,PA,NY
Perfluorotetradecanoic acid (PFTA)	NH-P,PA,NY
Perfluorotridecanoic acid (PFTrDA)	NH-P,PA,NY
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P,PA,NY
Perfluorodecanesulfonic acid (PFDS)	NH-P,PA
Perfluorooctanesulfonamide (FOSA)	NH-P,PA
Perfluorononanesulfonic acid (PFNS)	NH-P,PA
Perfluoro-1-hexanesulfonamide (FHxSA)	NH-P,PA
Perfluoro-1-butanesulfonamide (FBSA)	NH-P,PA
Perfluorohexanesulfonic acid (PFHxS)	NH-P,PA,NY
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P,PA,NY
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P,PA,NY
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P,PA,NY
Perfluoropentanesulfonic acid (PFPeS)	NH-P,PA,NY
Perfluoroundecanoic acid (PFUnA)	NH-P,PA,NY
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P,PA
Perfluoroheptanoic acid (PFHpA)	NH-P,PA,NY
Perfluorooctanoic acid (PFOA)	NH-P,PA,NY
Perfluorooctanesulfonic acid (PFOS)	NH-P,PA,NY
Perfluorononanoic acid (PFNA)	NH-P,PA,NY
SOP-466 PFAS in Soil	
Perfluorobutanoic acid (PFBA)	NH-P,PA,NY
Perfluorobutanesulfonic acid (PFBS)	NH-P,PA
Perfluoropentanoic acid (PFPeA)	NH-P,PA,NY
Perfluorohexanoic acid (PFHxA)	NH-P,PA,NY
11Cl-PF3OUdS (F53B Major)	NH-P,PA
9Cl-PF3ONS (F53B Minor)	NH-P,PA
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	NH-P,PA
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P,PA
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P,PA,NY
Perfluorodecanoic acid (PFDA)	NH-P,PA,NY
Perfluorododecanoic acid (PFDoA)	NH-P,PA,NY

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SOP-466 PFAS in Soil	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	NH-P,PA
Perfluoroheptanesulfonic acid (PFHpS)	NH-P,PA
N-EtFOSAA (NEtFOSAA)	NH-P,PA,NY
N-MeFOSAA (NMeFOSAA)	NH-P,PA
Perfluorotetradecanoic acid (PFTA)	NH-P,PA,NY
Perfluorotridecanoic acid (PFTrDA)	NH-P,PA,NY
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P,PA
Perfluorodecanesulfonic acid (PFDS)	NH-P,PA
Perfluorooctanesulfonamide (FOSA)	NH-P,PA
Perfluorononanesulfonic acid (PFNS)	NH-P,PA
Perfluoro-1-hexanesulfonamide (FHxSA)	NH-P,PA
Perfluoro-1-butanesulfonamide (FBSA)	NH-P,PA
Perfluorohexanesulfonic acid (PFHxS)	NH-P,PA
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P,PA
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P,PA
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P,PA
Perfluoropentanesulfonic acid (PFPeS)	NH-P,PA
Perfluoroundecanoic acid (PFUnA)	NH-P,PA,NY
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P,PA
Perfluoroheptanoic acid (PFHpA)	NH-P,PA,NY
Perfluorooctanoic acid (PFOA)	NH-P,PA,NY
Perfluorooctanesulfonic acid (PFOS)	NH-P,PA,NY
Perfluorononanoic acid (PFNA)	NH-P,PA,NY

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
NY	New York State Department of Health	10899 NELAP	04/1/2024
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2024
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2024

23L1211

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CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev S_07/13/2021

Page 1 of 2

Company Name: Horsley Witten Group
Address: 90 Route 6A, Sandwich, MA
Phone: 508-833-6600
Project Name: HW-Capecod Gateway
Project Location: Hyannis
Project Number: 23070
Project Manager: Mark Nelson / Bryan Massa
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: Caroline Armstrong

Requested Turnaround Time			
7-Day	☐	10-Day	☐
PFAS 10-Day (std)	☒	Due Date:	
Rush-Approval Required			
1-Day	☐	3-Day	☐
2-Day	☐	4-Day	☐

Dissolved Metals Samples	
○	Field Filtered
○	Lab to Filter
Orthophosphate Samples	
○	Field Filtered
○	Lab to Filter

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To:
Fax To #:

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PFAS (isotope dilution)
1	HW-I(S)	12/5/23	1010	G	GW				2			X
2	HW-I(M)		1200									X
3	HW-I(D)		1115									X
4	HW-P(S)		1315									X
5	HW-P(M)		1555									X
6	HW-3	12/6/23	1030									X
7	HW-302		1055									X
8	~~HW-D~~ HW-S(S)		1130									X
9	HW-S(M)		1355									X

[2] Preservation Code

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y (N)
Glassware in freezer? Y (N)
Prepackaged Cooler? Y (N)
*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time:
Caroline Armstrong	12/8 1040
Received by: (signature)	Date/Time:
Dan Sheehan	12/8/23 1040
Relinquished by: (signature)	Date/Time:
Dan Sheehan	12/8 1735
Received by: (signature)	Date/Time:
GXPL 3.1	12/8/23 1735
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: MCP-GW-1

Detection Limit Requirements
MA: GW-1
CT:
Other:

Special Requirements
☒ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

23L1211

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CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 3B1 Rev 5_07/13/2021

Page 2 of 2

Company Name: Horsley Witten Group
Address: 90 Route 6A Sandwich, MA
Phone: 508-833-6600
Project Name: HYA-Capecod Gateway
Project Location: 23070
Project Number: Hyannis
Project Manager: Marc Nelson / Bryan Massa
Pace Quote Name/Number:
Invoice Recipient:
Sampled By: Caroline Armstrong

Requested Turnaround Time			
7-Day	☐	1D-Day	☐
PFAS 10-Day (std)	☒	Due Date:	

Rush-Approval Required			
1-Day	☐	3-Day	☐
2-Day	☐	4-Day	☐

Data Delivery	
Format: PDF	☒ EXCEL ☒
Other:	
CLP Like Data Pkg Required:	☐
Email To:	
Fax To #:	

Dissolved Metals Samples	
○	Field Filtered
○	Lab to Filter

Orthophosphate Samples	
○	Field Filtered
○	Lab to Filter

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NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PFAS (Isotope dilution)
10	ME-1	12/6/23	1417	G	GW				2			X
11	ME-2	↓	1405	G	GW				2			X
12	ME-3	↓	1410	G	GW				2			X

[2] Preservation Code

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time:	Received by: (signature)	Date/Time:
Caroline Armstrong	12/8 1040	Dan Bellotti	12/8/23 1040
Dan Bellotti	12/8 1735	GUY YM 3.1	12/8/23 1735

Client Comments: MCP GW-1

Detection Limit Requirements
MA: GW-1
GT:
Other:

Special Requirements
☒ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP, LLC

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Pace ANALYTICAL SERVICES	DC#_Title: ENV-FRM-ELON-0001 v07_Sample Receiving Checklist
	Effective Date: 07/13/2023

Log In Back-Sheet

Client Horsley Witten

Project HYA

MCP/RCP Required MA MCP

Deliverable Package Requirement CW-1

Location MA

PWSID# (When Applicable) NA

Arrival Method:

Courier ☑ Fed Ex ☐ Walk In ☐ Other ☐

Received By / Date / Time GL 12/8/23 1735

Back-Sheet By / Date / Time GL 12/8/23 2117

Temperature Method gun # 5

Temp < 6° C Actual Temperature 3.1

Rush Samples: Yes / (No) Notify

Short Hold: Yes / (No) Notify

Notes regarding Samples/COC outside of SOP:

Login Sample Receipt Checklist – (Rejection Criteria Listing – Using Acceptance Policy) Any False statement will be brought to the attention of the Client – True or False

	True	False
Received on Ice	☑	☐
Received in Cooler	☑	☐
Custody Seal: DATE TIME	☐	☑
COC Relinquished	☑	☐
COC/Samples Labels Agree	☑	☐
All Samples in Good Condition	☑	☐
Samples Received within Holding Time	☑	☐
Is there enough Volume	☑	☐
Proper Media/Container Used	☑	☐
Splitting Samples Required	☐	☑
MS/MSD	☐	☑
Trip Blanks	☐	☑
Lab to Filters	☐	☑
COC Legible	☑	☐

COC Included: (Check all included)

Client ☑ Analysis ☑ Sampler Name ☑

Project ☑ IDs ☑ Collection Date/Time ☑

All Samples Proper pH: (N/A) ☐ ☐

Additional Container Notes

Note: West Virginia requires all samples to have their temperature taken. Note any outliers.

Pace ANALYTICAL SERVICES	DC#_Title: ENV-FRM-ELON-0001 v07_Sample Receiving Checklist
	Effective Date: 07/13/2023

Sample			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
16oz Amb/Clear	(Circle Amb/Clear)	Soils Jars																				
8oz Amb/Clear																						
4oz Amb/Clear																						
2oz Amb/Clear																						
Unpreserved	1 Liter	Ambers																				
HCL																						
Sulfuric																						
Sulfuric	250mL																					
Phosphoric																						
HCl																						
Unpreserved	100mL																					
Unpreserved	1 Liter	Plastics																				
Sulfuric																						
Unpreserved	500mL																					
Sulfuric																						
Unpreserved	250mL			2																		
Trizma																						
Sulfuric																						
Nitric																						
NaOH																						
Ammonium Acetate																						
NaOH/Zinc																						
Unpreserved		VOA Vials																				
HCl																						
MeOH																						
D.I. Water																						
BiSulfate																						
Col/Bact		Other / Fill in																				

Qualtrax ID: 120836

ANALYTICAL REPORT

Lab Number:	L2332762
Client:	Horseley & Witten, Inc. Sextant Hill Office Park 90 Route 6A Sandwich, MA 02563
ATTN:	Brian Massa
Phone:	(508) 833-6600
Project Name:	CAPECOD GATEWAY AIRPORT
Project Number:	23070
Report Date:	06/30/23

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0825), DoD (L2474), FL (E87814), IL (200081), IN (C-MA-04), KY (KY98046), LA (85084), ME (MA00030), MD (350), MI (99110) , NJ (MA015), NY (11627), NC (685), OH (CL106), OR (MA-0262), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #525-23-107-88708), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2332762-01	HW-I (S)	WATER	HYANIS, MA	06/07/23 10:10	06/09/23
L2332762-02	HW-I (M)	WATER	HYANIS, MA	06/07/23 12:15	06/09/23
L2332762-03	HW-I (D)	WATER	HYANIS, MA	06/07/23 11:15	06/09/23
L2332762-04	HW-P (S)	WATER	HYANIS, MA	06/08/23 10:25	06/09/23
L2332762-05	HW-P (M)	WATER	HYANIS, MA	06/08/23 11:48	06/09/23
L2332762-06	HW-S (S)	WATER	HYANIS, MA	06/09/23 10:08	06/09/23
L2332762-07	HW-S (M)	WATER	HYANIS, MA	06/09/23 12:25	06/09/23

Project Name:	CAPECOD GATEWAY AIRPORT	**Lab Number:**	L2332762
Project Number:	23070	**Report Date:**	06/30/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	CAPECOD GATEWAY AIRPORT	**Lab Number:**	L2332762
Project Number:	23070	**Report Date:**	06/30/23

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution

L2332762-01 and -06: The sample has elevated detection limits due to the limited sample volume utilized during extraction, as required by the high concentrations in the screen results.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Darian Dailey

Title: Technical Director/Representative Date: 06/30/23

ORGANICS

SEMIVOLATILES

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070
Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-01
Client ID: HW-I (S)
Sample Location: HYANIS, MA

Date Collected: 06/07/23 10:10
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 18:05
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	43.0		ng/l	20.0	4.08	1
Perfluoropentanoic Acid (PFPeA)	166		ng/l	20.0	3.96	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	20.0	2.38	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	20.0	4.52	1
Perfluorohexanoic Acid (PFHxA)	87.4		ng/l	20.0	3.28	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	20.0	2.45	1
Perfluoroheptanoic Acid (PFHpA)	106		ng/l	20.0	2.25	1
Perfluorohexanesulfonic Acid (PFHxS)	69.2		ng/l	20.0	3.76	1
Perfluorooctanoic Acid (PFOA)	172		ng/l	20.0	2.36	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	1530		ng/l	20.0	13.3	1
Perfluoroheptanesulfonic Acid (PFHpS)	9.88	J	ng/l	20.0	6.88	1
Perfluorononanoic Acid (PFNA)	235		ng/l	20.0	3.12	1
Perfluorooctanesulfonic Acid (PFOS)	708		ng/l	20.0	5.04	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	20.0	3.04	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	20.0	12.1	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	20.0	11.2	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	20.0	6.48	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	20.0	2.60	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	20.0	9.80	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	20.0	5.80	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	20.0	8.04	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	20.0	3.72	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	20.0	3.27	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	20.0	2.48	1

Project Name: CAPECOD GATEWAY AIRPORT **Lab Number:** L2332762

Project Number: 23070 **Report Date:** 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-01 Date Collected: 06/07/23 10:10

Client ID: HW-I (S) Date Received: 06/09/23

Sample Location: HYANIS, MA Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	100		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	109		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	97		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	98		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	97		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	99		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	100		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	119		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	99		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	111		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	112		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	100		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	17		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	113		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	96		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	93		22-136

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070
Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-02
Client ID: HW-I (M)
Sample Location: HYANIS, MA

Date Collected: 06/07/23 12:15
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 18:21
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	0.553	J	ng/l	1.74	0.354	1
Perfluoropentanoic Acid (PFPeA)	0.987	J	ng/l	1.74	0.344	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.74	0.207	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.74	0.393	1
Perfluorohexanoic Acid (PFHxA)	0.963	J	ng/l	1.74	0.285	1
Perfluoropentanesulfonic Acid (PFPeS)	0.219	JF	ng/l	1.74	0.213	1
Perfluoroheptanoic Acid (PFHpA)	1.16	J	ng/l	1.74	0.196	1
Perfluorohexanesulfonic Acid (PFHxS)	5.92		ng/l	1.74	0.327	1
Perfluorooctanoic Acid (PFOA)	0.977	J	ng/l	1.74	0.205	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.74	1.16	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.74	0.598	1
Perfluorononanoic Acid (PFNA)	0.518	J	ng/l	1.74	0.271	1
Perfluorooctanesulfonic Acid (PFOS)	6.76		ng/l	1.74	0.438	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.74	0.264	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.74	1.05	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.74	0.973	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.74	0.563	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.74	0.226	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.74	0.852	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.74	0.504	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.74	0.698	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.74	0.323	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.74	0.284	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.74	0.215	1

Project Name: CAPECOD GATEWAY AIRPORT **Lab Number:** L2332762

Project Number: 23070 **Report Date:** 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-02 Date Collected: 06/07/23 12:15
Client ID: HW-I (M) Date Received: 06/09/23
Sample Location: HYANIS, MA Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	82		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	90		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	113		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	115		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	79		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	105		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	109		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	90		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	106		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	95		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	108		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	97		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	96		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	13		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	97		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	95		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	76		22-136

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070
Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-03
Client ID: HW-I (D)
Sample Location: HYANIS, MA

Date Collected: 06/07/23 11:15
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 18:38
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	10.2		ng/l	1.74	0.356	1
Perfluoropentanoic Acid (PFPeA)	33.4		ng/l	1.74	0.345	1
Perfluorobutanesulfonic Acid (PFBS)	1.15	J	ng/l	1.74	0.208	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.74	0.394	1
Perfluorohexanoic Acid (PFHxA)	25.8		ng/l	1.74	0.286	1
Perfluoropentanesulfonic Acid (PFPeS)	1.48	J	ng/l	1.74	0.214	1
Perfluoroheptanoic Acid (PFHpA)	10.8		ng/l	1.74	0.196	1
Perfluorohexanesulfonic Acid (PFHxS)	28.0		ng/l	1.74	0.328	1
Perfluorooctanoic Acid (PFOA)	10.1		ng/l	1.74	0.206	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.74	1.16	1
Perfluoroheptanesulfonic Acid (PFHpS)	2.43		ng/l	1.74	0.600	1
Perfluorononanoic Acid (PFNA)	1.17	J	ng/l	1.74	0.272	1
Perfluorooctanesulfonic Acid (PFOS)	71.9		ng/l	1.74	0.440	1
Perfluorodecanoic Acid (PFDA)	0.296	JF	ng/l	1.74	0.265	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.74	1.06	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.74	0.977	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.74	0.565	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.74	0.227	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.74	0.855	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.74	0.506	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.74	0.701	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.74	0.324	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.74	0.285	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.74	0.216	1

Project Name: CAPECOD GATEWAY AIRPORT **Lab Number:** L2332762

Project Number: 23070 **Report Date:** 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-03 Date Collected: 06/07/23 11:15
Client ID: HW-I (D) Date Received: 06/09/23
Sample Location: HYANIS, MA Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	81		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	91		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	112		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	76		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	104		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	85		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	105		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	79		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	80		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	70		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	77		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	80		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	70		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	5		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	63		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	57		22-136

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070
Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-04
Client ID: HW-P (S)
Sample Location: HYANIS, MA

Date Collected: 06/08/23 10:25
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 18:54
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	12.3		ng/l	1.76	0.359	1
Perfluoropentanoic Acid (PFPeA)	28.6		ng/l	1.76	0.348	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.76	0.209	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.76	0.397	1
Perfluorohexanoic Acid (PFHxA)	15.5		ng/l	1.76	0.288	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.76	0.216	1
Perfluoroheptanoic Acid (PFHpA)	6.98		ng/l	1.76	0.198	1
Perfluorohexanesulfonic Acid (PFHxS)	0.798	JF	ng/l	1.76	0.330	1
Perfluorooctanoic Acid (PFOA)	14.5		ng/l	1.76	0.207	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	4.41		ng/l	1.76	1.17	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.76	0.605	1
Perfluorononanoic Acid (PFNA)	15.1		ng/l	1.76	0.274	1
Perfluorooctanesulfonic Acid (PFOS)	1.38	JF	ng/l	1.76	0.443	1
Perfluorodecanoic Acid (PFDA)	0.464	J	ng/l	1.76	0.267	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.76	1.06	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.76	0.985	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.76	0.570	1
Perfluoroundecanoic Acid (PFUnA)	0.243	JF	ng/l	1.76	0.228	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.76	0.862	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.76	0.510	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.76	0.707	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.76	0.327	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.76	0.288	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.76	0.218	1

Project Name: CAPECOD GATEWAY AIRPORT **Lab Number:** L2332762

Project Number: 23070 **Report Date:** 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-04 Date Collected: 06/08/23 10:25

Client ID: HW-P (S) Date Received: 06/09/23

Sample Location: HYANIS, MA Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	72		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	79		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	116		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	66		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	67		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	70		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	109		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	67		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	97		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	72		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	104		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	78		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	76		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	6		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	75		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	74		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	73		22-136

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070
Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-05
Client ID: HW-P (M)
Sample Location: HYANIS, MA

Date Collected: 06/08/23 11:48
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 19:11
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	6.07		ng/l	1.74	0.354	1
Perfluoropentanoic Acid (PFPeA)	14.9		ng/l	1.74	0.344	1
Perfluorobutanesulfonic Acid (PFBS)	0.278	J	ng/l	1.74	0.207	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.74	0.392	1
Perfluorohexanoic Acid (PFHxA)	7.88		ng/l	1.74	0.285	1
Perfluoropentanesulfonic Acid (PFPeS)	0.354	J	ng/l	1.74	0.213	1
Perfluoroheptanoic Acid (PFHpA)	4.51		ng/l	1.74	0.196	1
Perfluorohexanesulfonic Acid (PFHxS)	3.40		ng/l	1.74	0.326	1
Perfluorooctanoic Acid (PFOA)	3.78		ng/l	1.74	0.205	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.74	1.16	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.74	0.598	1
Perfluorononanoic Acid (PFNA)	7.46		ng/l	1.74	0.271	1
Perfluorooctanesulfonic Acid (PFOS)	2.75		ng/l	1.74	0.438	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.74	0.264	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.74	1.05	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.74	0.973	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.74	0.563	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.74	0.226	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.74	0.851	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.74	0.504	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.74	0.698	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.74	0.323	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.74	0.284	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.74	0.215	1

Project Name: CAPECOD GATEWAY AIRPORT **Lab Number:** L2332762

Project Number: 23070 **Report Date:** 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-05 Date Collected: 06/08/23 11:48

Client ID: HW-P (M) Date Received: 06/09/23

Sample Location: HYANIS, MA Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	79		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	88		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	94		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	74		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	73		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	104		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	79		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	103		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	80		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	82		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	96		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	94		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	87		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	17		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	87		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	85		22-136

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070
Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-06
Client ID: HW-S (S)
Sample Location: HYANIS, MA

Date Collected: 06/09/23 10:08
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 19:28
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	32.3		ng/l	10.0	2.04	1
Perfluoropentanoic Acid (PFPeA)	135		ng/l	10.0	1.98	1
Perfluorobutanesulfonic Acid (PFBS)	1.74	J	ng/l	10.0	1.19	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	10.0	2.26	1
Perfluorohexanoic Acid (PFHxA)	77.0		ng/l	10.0	1.64	1
Perfluoropentanesulfonic Acid (PFPeS)	3.26	J	ng/l	10.0	1.23	1
Perfluoroheptanoic Acid (PFHpA)	46.7		ng/l	10.0	1.13	1
Perfluorohexanesulfonic Acid (PFHxS)	30.0		ng/l	10.0	1.88	1
Perfluorooctanoic Acid (PFOA)	52.1		ng/l	10.0	1.18	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	1150		ng/l	10.0	6.66	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	10.0	3.44	1
Perfluorononanoic Acid (PFNA)	44.2		ng/l	10.0	1.56	1
Perfluorooctanesulfonic Acid (PFOS)	185		ng/l	10.0	2.52	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	10.0	1.52	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	10.0	6.06	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	10.0	5.60	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	10.0	3.24	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	10.0	1.30	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	10.0	4.90	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	10.0	2.90	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	10.0	4.02	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	10.0	1.86	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	10.0	1.64	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	10.0	1.24	1

Project Name: CAPECOD GATEWAY AIRPORT **Lab Number:** L2332762

Project Number: 23070 **Report Date:** 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-06 Date Collected: 06/09/23 10:08

Client ID: HW-S (S) Date Received: 06/09/23

Sample Location: HYANIS, MA Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	74		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	84		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	94		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	73		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	83		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	126		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	95		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	106		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	107		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	101		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	20		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	99		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	98		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	88		22-136

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070
Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-07
Client ID: HW-S (M)
Sample Location: HYANIS, MA

Date Collected: 06/09/23 12:25
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 19:44
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	10.8		ng/l	1.77	0.360	1
Perfluoropentanoic Acid (PFPeA)	38.0		ng/l	1.77	0.350	1
Perfluorobutanesulfonic Acid (PFBS)	0.533	J	ng/l	1.77	0.210	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.77	0.399	1
Perfluorohexanoic Acid (PFHxA)	24.1		ng/l	1.77	0.290	1
Perfluoropentanesulfonic Acid (PFPeS)	0.749	J	ng/l	1.77	0.216	1
Perfluoroheptanoic Acid (PFHpA)	25.7		ng/l	1.77	0.199	1
Perfluorohexanesulfonic Acid (PFHxS)	21.6		ng/l	1.77	0.332	1
Perfluorooctanoic Acid (PFOA)	29.7		ng/l	1.77	0.208	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	198		ng/l	1.77	1.18	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.93		ng/l	1.77	0.608	1
Perfluorononanoic Acid (PFNA)	26.2		ng/l	1.77	0.276	1
Perfluorooctanesulfonic Acid (PFOS)	255		ng/l	1.77	0.445	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.77	0.268	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	3.23		ng/l	1.77	1.07	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.77	0.989	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.77	0.572	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.77	0.230	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.77	0.865	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.77	0.512	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.77	0.710	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.77	0.328	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.77	0.289	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.77	0.219	1

Project Name: CAPECOD GATEWAY AIRPORT **Lab Number:** L2332762

Project Number: 23070 **Report Date:** 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-07 Date Collected: 06/09/23 12:25

Client ID: HW-S (M) Date Received: 06/09/23

Sample Location: HYANIS, MA Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	85		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	95		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	112		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	114		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	84		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	85		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	113		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	144		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	96		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	116		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	101		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	100		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	20		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	103		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	95		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	89		22-136

Project Name: CAPECOD GATEWAY AIRPORT **Lab Number:** L2332762

Project Number: 23070 **Report Date:** 06/30/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 12:39
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-07 Batch: WG1797335-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 12:39
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-07 Batch: WG1797335-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	101		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	108		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	102		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	102		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	103		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	100		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	105		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	108		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	101		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	96		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	121		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	94		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	104		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	35		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	97		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	96		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	91		22-136

Lab Control Sample Analysis

Batch Quality Control

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 Batch: WG1797335-2								
Perfluorobutanoic Acid (PFBA)	99		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	100		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	94		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	99		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	99		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	101		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	100		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	96		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	98		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	96		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	98		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	102		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	93		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	101		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	105		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	100		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	103		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	102		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	104		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	103		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	92		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	95		-		67-153	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 Batch: WG1797335-2								
Perfluorotridecanoic Acid (PFTrDA)	113		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	100		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	104				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	112				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	101				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	107				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	101				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	99				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	103				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	112				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	102				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	121				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	103				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	107				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	31				5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	109				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	109				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	103				22-136

Matrix Spike Analysis

Batch Quality Control

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1797335-3 QC Sample: L2332157-01 Client ID: MS Sample												
Perfluorobutanesulfonic Acid (PFBS)	1.07J	35	33.4	92		-	-		65-157	-		30
Perfluorohexanoic Acid (PFHxA)	3.71	39.4	41.4	96		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	0.335J	37.1	36.0	96		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	2.33	39.4	40.3	96		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	1.81J	36	36.8	97		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	5.04	39.4	42.7	96		-	-		63-159	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	37.6	37.7	100		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	0.390J	39.4	40.8	103		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	3.28F	36.5	38.3	96		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	ND	39.4	39.8	101		-	-		63-171	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	39.4	38.0	96		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	39.4	39.2	100		-	-		60-153	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	39.4	36.3	92		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	39.4	38.5	98		-	-		67-153	-		30
Perfluorotridecanoic Acid (PFTrDA)	ND	39.4	42.7	108		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	39.4	38.4	98		-	-		59-182	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	384	378	98		-	-		57-162	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	37.2	32.0	86		-	-		69-143	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	36.8	34.4	94		-	-		55-158	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	37.2	35.9	97		-	-		52-156	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070
Lab Number: L2332762
Report Date: 06/30/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1797335-3 QC Sample: L2332157-01 Client ID: MS Sample												

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	71				10-165
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	95				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	95				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	85				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	78				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	75				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	99				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	87				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	86				22-136
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	80				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	78				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	104				70-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1797335-4 QC Sample: L2332728-01 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	14.1	13.7	ng/l	3		30
Perfluoropentanoic Acid (PFPeA)	10.9	10.0	ng/l	9		30
Perfluorobutanesulfonic Acid (PFBS)	1.37J	1.41J	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	9.19	8.84	ng/l	4		30
Perfluoropentanesulfonic Acid (PFPeS)	0.793J	0.630J	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	9.92	9.43	ng/l	5		30
Perfluorohexanesulfonic Acid (PFHxS)	4.92	4.87	ng/l	1		30
Perfluorooctanoic Acid (PFOA)	62.1	59.2	ng/l	5		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	2.13	1.73J	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	2.13	2.08	ng/l	2		30
Perfluorooctanesulfonic Acid (PFOS)	23.0	22.6	ng/l	2		30
Perfluorodecanoic Acid (PFDA)	0.337JF	0.295J	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1797335-4 QC Sample: L2332728-01 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	29.4	23.9	ng/l	21		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	89		83		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	89		84		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	89		84		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**158**	Q	**153**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	73		68		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	80		75		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	91		84		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	85		80		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**169**	Q	**152**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	80		77		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	76		71		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	75		67		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	155		136		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	108		84		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	75		65		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	26		11		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	121		103		27-126

Lab Duplicate Analysis
Batch Quality Control

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1797335-4 QC Sample: L2332728-01 Client ID: DUP Sample

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	71		61		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	64		60		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	75		71		10-165

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2332762-01A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-01B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-02A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-02B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-03A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-03B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-04A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-04B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-05A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-05B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-06A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-06B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-07A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-07B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)

*Values in parentheses indicate holding time in days

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA/PFTeDA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS/PFDoS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
Perfluoropropanesulfonic Acid	PFPrS	423-41-6
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA/PFOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070
Lab Number: L2332762
Report Date: 06/30/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
FLUOROTELOMER CARBOXYLIC ACIDS (FTCAs)		
3-Perfluoroheptyl Propanoic Acid	7:3FTCA	812-70-4
2H,2H,3H,3H-Perfluorooctanoic Acid	5:3FTCA	914637-49-3
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5

Project Name:	CAPECOD GATEWAY AIRPORT	**Lab Number:**	L2332762
Project Number:	23070	**Report Date:**	06/30/23

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	CAPECOD GATEWAY AIRPORT	**Lab Number:**	L2332762
Project Number:	23070	**Report Date:**	06/30/23

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers

Project Name:	CAPECOD GATEWAY AIRPORT	**Lab Number:**	L2332762
Project Number:	23070	**Report Date:**	06/30/23

Data Qualifiers

Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: DU Report with 'J' Qualifiers

Project Name:	CAPECOD GATEWAY AIRPORT	**Lab Number:**	L2332762
Project Number:	23070	**Report Date:**	06/30/23

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625.1: alpha-Terpineol
EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables).
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 6/9/23

ALPHA Job #: L2332762

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Client Information

Client: HORSLEY WITTEN GROUP
Address: 90 ROUTE 6A
SANDWICH, MA 02563
Phone: 508-833-6600
Email: jgustavesen@horsleywitten.com

Additional Project Information:

Project Information

Project Name: CAPE COD GATEWAY AIRPORT
Project Location: HYANNIS, MA
Project #: 23070
Project Manager: BRYAN MASSA
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due:

Report Information - Data Deliverables

☐ ADEx ☒ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☒ Yes ☐ No MA MCP Analytical Methods
☐ Yes ☒ No CT RCP Analytical Methods
☐ Yes ☒ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☒ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☒ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	PFAS	Sample Comments	Total # Bottles
32762-01	HW-I(S)	6/7/23	1010	GW	JG	X		2
-02	HW-I(M)	6/7/23	1215					
-03	HW-I(D)	6/7/23	1115					
-04	HW-P(S)	6/8/23	1025					
-05	HW-P(M)	6/8/23	1148					
-06	HW-S(S)	6/9/23	1008					
-07	HW-S(M)	6/9/23	1225					

ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☐ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint

SAMPLE INFO
Filtration
☐ Field
☐ Lab to do
Preservation
☐ Lab to do

Container Type	P
Preservative	A

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H= $Na_2S_2O_3$
I= Ascorbic Acid
J= NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
	6/9/23 1331	HW FRIDGE	6/9/23 1337
HW FRIDGE	6/9 16:00		6/9 16:00
	6/9 17:45		6/9 1745
06109123-1930			6/9/23 1930

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.
FORM NO: 01-01 (rev. 12-Mar-2012)

6/9/23 2130

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

June 12, 2023

Bryan Massa
Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563

Project Location: Barnstable, MA
Client Job Number:
Project Number: [none]
Laboratory Work Order Number: 23F0282

Enclosed are results of analyses for samples as received by the laboratory on June 2, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kaitlyn A. Feliciano
Project Manager

Table of Contents

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563
ATTN: Bryan Massa

REPORT DATE: 6/12/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: [none]

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23F0282

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Barnstable, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
HW-R	23F0282-01	Ground Water		SOP-454 PFAS	
HW-H	23F0282-02	Ground Water		SOP-454 PFAS	

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SOP-454 PFAS

Qualifications:

PF-17

Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.

Analyte & Samples(s) Qualified:

M2-6:2FTS
23F0282-01[HW-R]

S-29

Extracted Internal Standard is outside of control limits.

Analyte & Samples(s) Qualified:

M2-8:2FTS
S088826-CCV1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

Perfluoro-1-hexanesulfonamide (FHxSA)
23F0282-01[HW-R], 23F0282-02[HW-H], S088826-CCV2, S088826-CCV3

V-20

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Perfluorononanesulfonic acid (PFNS)
S088826-CCV1

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Meghan E. Kelley
Reporting Specialist

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA
Sample Description:
Work Order: 23F0282

Date Received: 6/2/2023

Field Sample #: HW-R
Sampled: 6/1/2023 10:25

Sample ID: 23F0282-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	11	1.8	0.65	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorobutanesulfonic acid (PFBS)	1.2	1.8	0.65	ng/L	1	J	SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoropentanoic acid (PFPeA)	40	1.8	0.70	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorohexanoic acid (PFHxA)	24	1.8	0.72	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.65	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.91	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.52	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.84	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorodecanoic acid (PFDA)	ND	1.8	0.73	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.81	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.64	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	0.72	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.84	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.73	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.91	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.89	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.90	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.92	ng/L	1	V-05	SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorohexanesulfonic acid (PFHxS)	1.2	1.8	0.63	ng/L	1	J	SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.63	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.57	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	1.1	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoropentanesulfonic acid (PFPeS)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoroheptanoic acid (PFHpA)	9.9	1.8	0.74	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorooctanoic acid (PFOA)	ND	1.8	1.2	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorooctanesulfonic acid (PFOS)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorononanoic acid (PFNA)	ND	1.8	0.81	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW

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Project Location: Barnstable, MA | Sample Description: | Work Order: 23F0282

Date Received: 6/2/2023

Field Sample #: HW-H | Sampled: 6/1/2023 11:15

Sample ID: 23F0282-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	3.4	1.8	0.67	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoropentanoic acid (PFPeA)	8.7	1.8	0.72	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorohexanoic acid (PFHxA)	7.8	1.8	0.74	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorodecanoic acid (PFDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.83	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.72	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.95	ng/L	1	V-05	SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorohexanesulfonic acid (PFHxS)	0.99	1.8	0.64	ng/L	1	J	SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.64	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.59	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	1.1	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoropentanesulfonic acid (PFPeS)	ND	1.8	0.69	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoroheptanoic acid (PFHpA)	ND	1.8	0.76	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorooctanoic acid (PFOA)	ND	1.8	1.2	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorooctanesulfonic acid (PFOS)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorononanoic acid (PFNA)	ND	1.8	0.83	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW

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Sample Extraction Data

Prep Method:SOP 454-PFAAS **Analytical Method:SOP-454 PFAS**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23F0282-01 [HW-R]	B342148	285	1.00	06/06/23
23F0282-02 [HW-H]	B342148	277	1.00	06/06/23

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B342148 - SOP 454-PFAAS										
Blank (B342148-BLK1)				Prepared: 06/06/23 Analyzed: 06/08/23						
Perfluorobutanoic acid (PFBA)	ND	1.9	ng/L							
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	ng/L							
Perfluoropentanoic acid (PFPeA)	ND	1.9	ng/L							
Perfluorohexanoic acid (PFHxA)	ND	1.9	ng/L							
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L							
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L							
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L							
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L							
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	ng/L							
Perfluorodecanoic acid (PFDA)	ND	1.9	ng/L							
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L							
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	ng/L							
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	ng/L							
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L							
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L							
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L							
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L							
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L							
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L							
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L							
Perfluorononanesulfonic acid (PFNS)	ND	1.9	ng/L							
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	ng/L							
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	ng/L							
Perfluorohexanesulfonic acid (PFHxS)	ND	1.9	ng/L							
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L							
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L							
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	ng/L							
Perfluoropentanesulfonic acid (PFPeS)	ND	1.9	ng/L							
Perfluoroundecanoic acid (PFUnA)	ND	1.9	ng/L							
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L							
Perfluoroheptanoic acid (PFHpA)	ND	1.9	ng/L							
Perfluorooctanoic acid (PFOA)	ND	1.9	ng/L							
Perfluorooctanesulfonic acid (PFOS)	ND	1.9	ng/L							
Perfluorononanoic acid (PFNA)	ND	1.9	ng/L							
LCS (B342148-BS1)				Prepared: 06/06/23 Analyzed: 06/08/23						
Perfluorobutanoic acid (PFBA)	8.65	1.9	ng/L	9.69		89.2	73-129			
Perfluorobutanesulfonic acid (PFBS)	7.63	1.9	ng/L	8.58		89.0	72-130			
Perfluoropentanoic acid (PFPeA)	8.25	1.9	ng/L	9.69		85.2	72-129			
Perfluorohexanoic acid (PFHxA)	8.47	1.9	ng/L	9.69		87.4	72-129			
11Cl-PF3OUdS (F53B Major)	7.82	1.9	ng/L	9.13		85.6	55.1-141			
9Cl-PF3ONS (F53B Minor)	7.64	1.9	ng/L	9.03		84.6	59.6-146			
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	7.70	1.9	ng/L	9.13		84.3	60.3-131			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	6.38	1.9	ng/L	9.69		65.9	37.6-167			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	9.08	1.9	ng/L	9.30		97.6	67-138			
Perfluorodecanoic acid (PFDA)	8.65	1.9	ng/L	9.69		89.2	71-129			
Perfluorododecanoic acid (PFDoA)	8.69	1.9	ng/L	9.69		89.7	72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	7.44	1.9	ng/L	8.62		86.2	49.4-154			

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B342148 - SOP 454-PFAAS										
LCS (B342148-BS1)				Prepared: 06/06/23 Analyzed: 06/08/23						
Perfluoroheptanesulfonic acid (PFHpS)	8.52	1.9	ng/L	9.25		92.1	69-134			
N-EtFOSAA (NEtFOSAA)	8.19	1.9	ng/L	9.69		84.5	61-135			
N-MeFOSAA (NMeFOSAA)	9.28	1.9	ng/L	9.69		95.8	65-136			
Perfluorotetradecanoic acid (PFTA)	7.93	1.9	ng/L	9.69		81.8	71-132			
Perfluorotridecanoic acid (PFTrDA)	9.53	1.9	ng/L	9.69		98.3	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	8.02	1.9	ng/L	9.06		88.5	63-143			
Perfluorodecanesulfonic acid (PFDS)	7.74	1.9	ng/L	9.35		82.8	53-142			
Perfluorooctanesulfonamide (FOSA)	8.90	1.9	ng/L	9.69		91.8	67-137			
Perfluorononanesulfonic acid (PFNS)	8.23	1.9	ng/L	9.30		88.5	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	6.33	1.9	ng/L	9.69		65.3	61.7-156			
Perfluoro-1-butanesulfonamide (FBSA)	7.08	1.9	ng/L	9.69		73.1	61.3-145			
Perfluorohexanesulfonic acid (PFHxS)	7.43	1.9	ng/L	8.87		83.8	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	8.24	1.9	ng/L	9.69		85.0	59.8-147			
Perfluoro-5-oxahexanoic acid (PFMBA)	8.39	1.9	ng/L	9.69		86.5	59.5-146			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	6.87	1.9	ng/L	9.21		74.6	64-140			
Perfluoropentanesulfonic acid (PFPeS)	7.65	1.9	ng/L	9.11		83.9	71-127			
Perfluoroundecanoic acid (PFUnA)	8.84	1.9	ng/L	9.69		91.2	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	7.93	1.9	ng/L	9.69		81.9	58.5-143			
Perfluoroheptanoic acid (PFHpA)	8.81	1.9	ng/L	9.69		90.9	72-130			
Perfluorooctanoic acid (PFOA)	8.75	1.9	ng/L	9.69		90.3	71-133			
Perfluorooctanesulfonic acid (PFOS)	8.58	1.9	ng/L	8.96		95.7	65-140			
Perfluorononanoic acid (PFNA)	6.96	1.9	ng/L	9.69		71.8	69-130			

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
PF-17	Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.
S-29	Extracted Internal Standard is outside of control limits.
V-05	Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.
V-20	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-R (23F0282-01)			Lab File ID: 23F0282-01.d			Analyzed: 06/08/23 16:32			
M8FOSA	211001.6	3.9486	268,784.00	3.9486	79	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	51181.51	2.4228	35,452.00	2.431017	144	50 - 150	-0.0082	+/-0.50	
M2PFTA	323478.5	4.248767	469,922.00	4.248767	69	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	85345.59	3.731083	77,186.00	3.731083	111	50 - 150	0.0000	+/-0.50	
MPFBA	144999.8	1.033533	277,346.00	1.033533	52	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	120862.5	2.76565	130,159.00	2.773833	93	50 - 150	-0.0082	+/-0.50	
M6PFDA	446925.3	3.739567	574,846.00	3.739567	78	50 - 150	0.0000	+/-0.50	
M3PFBS	118083.4	1.83695	127,381.00	1.83695	93	50 - 150	0.0000	+/-0.50	
M7PFUnA	404686.3	3.873917	481,877.00	3.8819	84	50 - 150	-0.0080	+/-0.50	
M2-6:2FTS	49683.5	3.3883	28,494.00	3.3883	174	50 - 150	0.0000	+/-0.50	*
M5PFPeA	228695.3	1.6652	278,521.00	1.6652	82	50 - 150	0.0000	+/-0.50	
M5PFHxA	418491.7	2.506633	467,599.00	2.51485	89	50 - 150	-0.0082	+/-0.50	
M3PFHxS	77013.32	3.153433	82,162.00	3.153433	94	50 - 150	0.0000	+/-0.50	
M4PFHpA	434091.8	3.113417	483,204.00	3.122333	90	50 - 150	-0.0089	+/-0.50	
M8PFOA	477298.3	3.397017	521,324.00	3.397017	92	50 - 150	0.0000	+/-0.50	
M8PFOS	74349.38	3.588267	77,713.00	3.588267	96	50 - 150	0.0000	+/-0.50	
M9PFNA	455007.4	3.589317	532,218.00	3.589317	85	50 - 150	0.0000	+/-0.50	
MPFDoA	322093.3	4.0087	390,006.00	4.0167	83	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	83401.87	3.881417	132,373.00	3.8894	63	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	93401.98	3.809467	140,897.00	3.809467	66	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-H (23F0282-02)			Lab File ID: 23F0282-02.d			Analyzed: 06/08/23 16:39			
M8FOSA	191588.9	3.9486	268,784.00	3.9486	71	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	41657.39	2.4228	35,452.00	2.431017	118	50 - 150	-0.0082	+/-0.50	
M2PFTA	359161.1	4.248767	469,922.00	4.248767	76	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	52997.11	3.731083	77,186.00	3.731083	69	50 - 150	0.0000	+/-0.50	
MPFBA	162831.8	1.033533	277,346.00	1.033533	59	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	113603.7	2.76565	130,159.00	2.773833	87	50 - 150	-0.0082	+/-0.50	
M6PFDA	395469.9	3.7316	574,846.00	3.739567	69	50 - 150	-0.0080	+/-0.50	
M3PFBS	110653.7	1.828667	127,381.00	1.83695	87	50 - 150	-0.0083	+/-0.50	
M7PFUnA	386337.7	3.873917	481,877.00	3.8819	80	50 - 150	-0.0080	+/-0.50	
M2-6:2FTS	37707.73	3.380233	28,494.00	3.3883	132	50 - 150	-0.0081	+/-0.50	
M5PFPeA	213186.3	1.6652	278,521.00	1.6652	77	50 - 150	0.0000	+/-0.50	
M5PFHxA	380034.9	2.506633	467,599.00	2.51485	81	50 - 150	-0.0082	+/-0.50	
M3PFHxS	69730.17	3.153433	82,162.00	3.153433	85	50 - 150	0.0000	+/-0.50	
M4PFHpA	396611.2	3.113417	483,204.00	3.122333	82	50 - 150	-0.0089	+/-0.50	
M8PFOA	449884.9	3.397017	521,324.00	3.397017	86	50 - 150	0.0000	+/-0.50	
M8PFOS	65539.32	3.588267	77,713.00	3.588267	84	50 - 150	0.0000	+/-0.50	
M9PFNA	439632.2	3.581317	532,218.00	3.589317	83	50 - 150	-0.0080	+/-0.50	
MPFDoA	307125.2	4.0087	390,006.00	4.0167	79	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	91506.02	3.881417	132,373.00	3.8894	69	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	95647.33	3.809467	140,897.00	3.809467	68	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B342148-BLK1)			Lab File ID: B342148-BLK1.d			Analyzed: 06/08/23 14:21			
M8FOSA	256694.9	3.9486	268,784.00	3.9486	96	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	41506.67	2.439333	35,452.00	2.431017	117	50 - 150	0.0083	+/-0.50	
M2PFTA	423753.3	4.256834	469,922.00	4.256834	90	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	87081.41	3.73905	77,186.00	3.73905	113	50 - 150	0.0000	+/-0.50	
MPFBA	287826	1.04185	277,346.00	1.033533	104	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	129662.1	2.782017	130,159.00	2.782017	100	50 - 150	0.0000	+/-0.50	
M6PFDA	523699.6	3.739567	574,846.00	3.739567	91	50 - 150	0.0000	+/-0.50	
M3PFBS	136324.6	1.845233	127,381.00	1.845233	107	50 - 150	0.0000	+/-0.50	
M7PFUnA	443994.6	3.8819	481,877.00	3.8819	92	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	34461.97	3.3883	28,494.00	3.3883	121	50 - 150	0.0000	+/-0.50	
M5PFPeA	299746.4	1.681733	278,521.00	1.673467	108	50 - 150	0.0083	+/-0.50	
M5PFHxA	503753.3	2.523067	467,599.00	2.523067	108	50 - 150	0.0000	+/-0.50	
M3PFHxS	83166.31	3.1615	82,162.00	3.153433	101	50 - 150	0.0081	+/-0.50	
M4PFHpA	514162.8	3.122317	483,204.00	3.122317	106	50 - 150	0.0000	+/-0.50	
M8PFOA	581790.5	3.405067	521,324.00	3.405067	112	50 - 150	0.0000	+/-0.50	
M8PFOS	71865.37	3.588267	77,713.00	3.588267	92	50 - 150	0.0000	+/-0.50	
M9PFNA	565916	3.5893	532,218.00	3.589317	106	50 - 150	0.0000	+/-0.50	
MPFDoA	361185.8	4.0167	390,006.00	4.0167	93	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	118862.9	3.8894	132,373.00	3.8894	90	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	130121.6	3.817433	140,897.00	3.809467	92	50 - 150	0.0080	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B342148-BS1)			Lab File ID: B342148-BS1.d			Analyzed: 06/08/23 14:13			
M8FOSA	255406.9	3.9486	268,784.00	3.9486	95	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	40160.35	2.439333	35,452.00	2.431017	113	50 - 150	0.0083	+/-0.50	
M2PFTA	458516.6	4.256834	469,922.00	4.256834	98	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	78121.29	3.73905	77,186.00	3.73905	101	50 - 150	0.0000	+/-0.50	
MPFBA	279092.3	1.04185	277,346.00	1.033533	101	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	135231.3	2.782017	130,159.00	2.782017	104	50 - 150	0.0000	+/-0.50	
M6PFDA	569540.6	3.739567	574,846.00	3.739567	99	50 - 150	0.0000	+/-0.50	
M3PFBS	132695.9	1.845233	127,381.00	1.845233	104	50 - 150	0.0000	+/-0.50	
M7PFUnA	460832.9	3.8819	481,877.00	3.8819	96	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	35179.05	3.3883	28,494.00	3.3883	123	50 - 150	0.0000	+/-0.50	
M5PFPeA	286399.5	1.681733	278,521.00	1.673467	103	50 - 150	0.0083	+/-0.50	
M5PFHxA	486166.7	2.523067	467,599.00	2.523067	104	50 - 150	0.0000	+/-0.50	
M3PFHxS	83622.95	3.1615	82,162.00	3.153433	102	50 - 150	0.0081	+/-0.50	
M4PFHpA	503771.8	3.122317	483,204.00	3.122317	104	50 - 150	0.0000	+/-0.50	
M8PFOA	555438.6	3.405067	521,324.00	3.405067	107	50 - 150	0.0000	+/-0.50	
M8PFOS	75263.58	3.588267	77,713.00	3.588267	97	50 - 150	0.0000	+/-0.50	
M9PFNA	560333.3	3.589317	532,218.00	3.589317	105	50 - 150	0.0000	+/-0.50	
MPFDoA	391526.1	4.0167	390,006.00	4.0167	100	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	124139.9	3.8894	132,373.00	3.8894	94	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	135218.1	3.817433	140,897.00	3.809467	96	50 - 150	0.0080	+/-0.50	

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SOP-454 PFAS in Water	
Perfluorobutanoic acid (PFBA)	NH-P
Perfluorobutanesulfonic acid (PFBS)	NH-P
Perfluoropentanoic acid (PFPeA)	NH-P
Perfluorohexanoic acid (PFHxA)	NH-P
11Cl-PF3OUdS (F53B Major)	NH-P
9Cl-PF3ONS (F53B Minor)	NH-P
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	NH-P
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P
Perfluorodecanoic acid (PFDA)	NH-P
Perfluorododecanoic acid (PFDoA)	NH-P
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	NH-P
Perfluoroheptanesulfonic acid (PFHpS)	NH-P
N-EtFOSAA (NEtFOSAA)	NH-P
N-MeFOSAA (NMeFOSAA)	NH-P
Perfluorotetradecanoic acid (PFTA)	NH-P
Perfluorotridecanoic acid (PFTrDA)	NH-P
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P
Perfluorodecanesulfonic acid (PFDS)	NH-P
Perfluorooctanesulfonamide (FOSA)	NH-P
Perfluorononanesulfonic acid (PFNS)	NH-P
Perfluoro-1-hexanesulfonamide (FHxSA)	NH-P
Perfluoro-1-butanesulfonamide (FBSA)	NH-P
Perfluorohexanesulfonic acid (PFHxS)	NH-P
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P
Perfluoropentanesulfonic acid (PFPeS)	NH-P
Perfluoroundecanoic acid (PFUnA)	NH-P
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P
Perfluoroheptanoic acid (PFHpA)	NH-P
Perfluorooctanoic acid (PFOA)	NH-P
Perfluorooctanesulfonic acid (PFOS)	NH-P
Perfluorononanoic acid (PFNA)	NH-P

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2023

JBF0282 KAF

Pace Analytical

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 1

Company Name:	Horsley Witten Group
Address:	90 Route 6A Sandwich, MA
Phone:	508-833-6600
Project Name:	HYA
Project Location:	Hyannis
Project Number:	
Project Manager:	Bryan Massa
Pace Quote Name/Number:	
Invoice Recipient:	
Sampled By:	Caroline Armstrong

Requested Turnaround Time

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☑ Due Date:

Rush-Approval Required

1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery

Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: bmassa@horsleywitten.com
Fax To #:

Dissolved Metals Samples

○ Field Filtered
○ Lab to Filter

Orthophosphate Samples

○ Field Filtered
○ Lab to Filter

PCB ONLY

SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

PFAS (Isotope dilution)

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1] Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE
1	HW-R	6/1/23	10:25	G	GW				2		
2	HW-H	6/1/23	11:15	G	GW				2		

[2] Preservation Code

Courier Use Only

Total Number Of:

VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N

Glassware in freezer? Y / N

Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Caroline Armstrong	Date/Time: 6/2/23 10:30
Received by: (signature)		Date/Time: 6/2/23 1030
Relinquished by: (signature)		Date/Time: 6/2/23 1800
Received by: (signature)	23	Date/Time: 6/2 1806
Relinquished by: (signature)		Date/Time:
Received by: (signature)		Date/Time:
Relinquished by: (signature)		Date/Time:
Received by: (signature)		Date/Time:

Client Comments: MCP GW-1

Detection Limit Requirements

MA: GW-1
GT:
Other:

Special Requirements

☒ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC accredited

Project Entity

Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other

☐ Chromatogram
☐ AIHA-LAP,LLC

Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

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East Longmeadow, MA. 01028
P: 413-525-2332
F:413-525-6405
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Log In Back-Sheet

Login Sample Receipt Checklist – (Rejection Criteria Listing – Using Acceptance Policy) Any False statement will be brought to the attention of the Client – True or False

Pace
PEOPLE ADVANCING SCIEN

Client: Horsley Witten
Project: HYA PFAS Monitoring
MCP/RCP Required: MA-MCP
Deliverable Package Req.: GW-1
Location: Hyannis, MA
PWSID# (When Applicable): n/a
Arrival Method:
Courier ☑ Fed Ex ☐ Walk In ☐ Other ☐
Received By / Date / Time: Mem 6/2/23 1806
Back-Sheet By / Date / Time: Mem 6/2/23 1821
Temperature Method: Gun # 5
Temp ☑ < 6° C Actual Temperature: 2.3
Rush Samples: Yes / No Notify: No
Short Hold: Yes / No Notify: No

	True	False
Received on Ice	☑	☐
Received in Cooler	☑	☐
Custody Seal: DATE TIME	☐	☑
COC Relinquished	☑	☐
COC/Samples Labels Agree	☑	☐
All Samples in Good Condition	☑	☐
Samples Received within Holding Time	☑	☐
Is there enough Volume	☑	☐
Proper Media/Container Used	☑	☐
Splitting Samples Required	☐	☑
MS/MSD	☐	☑
Trip Blanks	☐	☑
Lab to Filters	☐	☑
COC Legible	☑	☐

Notes regarding Samples/COC outside of SOP:

COC Included: (Check all included)
Client ☑ Analysis ☑ Sampler Name ☑
Project ☑ IDs ☑ Collection Date/Time ☑

All Samples Proper pH: (N/A) ☐ ☐

Container (Circle when applicable)	UnP	HCl	HNO3	H2SO4	NaOH	Trizma	NaS2O3	Other Preservative
1L Amber Plastic								
500 mL Amber Plastic								
250 mL Amber (Plastic)	4							
Other Amber Clear Plastic								
16oz Amber Clear								
8oz Amber Clear								
4oz Amber Clear								
2oz Amber Clear								
Col/Bacteria								
Flashpoint								
Plastic Bag								
SOC Kit								
Perchlorate								
Encore								
Frozen								

	Proper Headspace	UnP	HCl	MeOH	Bisulfate	DI	Thiosulfate	Sulfuric	Other
Vials									

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June 20, 2023

Bryan Massa
Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563

Project Location: Hyannis, MA
Client Job Number:
Project Number: 22071
Laboratory Work Order Number: 23E3794

Enclosed are results of analyses for samples as received by the laboratory on May 30, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kaitlyn A. Feliciano
Project Manager

Table of Contents

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563
ATTN: Bryan Massa

REPORT DATE: 6/20/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 22071

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23E3794

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Hyannis, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
ME-1	23E3794-01	Ground Water		SOP-454 PFAS	
ME-2	23E3794-02	Ground Water		SOP-454 PFAS	
ME-3	23E3794-03	Ground Water		SOP-454 PFAS	

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CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SOP-454 PFAS

Qualifications:

L-07

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.

Analyte & Samples(s) Qualified:

Perfluoroheptanesulfonic acid (PFHpS)
23E3794-01RE1[ME-1], 23E3794-02RE1[ME-2], 23E3794-03RE1[ME-3], B342713-BSD1

S-29

Extracted Internal Standard is outside of control limits.

Analyte & Samples(s) Qualified:

M2-6:2FTS
23E3794-01RE1[ME-1]

M2-8:2FTS
S088753-CCV1

M8FOSA
23E3794-02RE1[ME-2]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Meghan E. Kelley
Reporting Specialist

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Hyannis, MA | Sample Description: | Work Order: 23E3794

Date Received: 5/30/2023

Field Sample #: ME-1 | Sampled: 5/26/2023 08:45

Sample ID: 23E3794-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	19	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorobutanesulfonic acid (PFBS)	2.5	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoropentanoic acid (PFPeA)	60	1.8	0.72	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorohexanoic acid (PFHxA)	38	1.8	0.74	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.87	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorodecanoic acid (PFDA)	0.83	1.8	0.75	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.84	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.0	1.8	0.74	ng/L	1	L-07	SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.95	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-1-butanesulfonamide (FBSA)	1.3	1.8	0.71	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorohexanesulfonic acid (PFHxS)	29	1.8	0.65	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.65	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.59	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	43	1.8	1.1	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.4	1.8	0.69	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoroheptanoic acid (PFHpA)	18	1.8	0.76	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorooctanoic acid (PFOA)	18	1.8	1.2	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorooctanesulfonic acid (PFOS)	69	1.8	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorononanoic acid (PFNA)	11	1.8	0.84	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW

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Project Location: Hyannis, MA | Sample Description: | Work Order: 23E3794

Date Received: 5/30/2023

Field Sample #: ME-2 | Sampled: 5/26/2023 08:55

Sample ID: 23E3794-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	16	1.9	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorobutanesulfonic acid (PFBS)	4.2	1.9	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoropentanoic acid (PFPeA)	54	1.9	0.75	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorohexanoic acid (PFHxA)	40	1.9	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.9	0.71	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.9	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.98	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.56	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	5.7	1.9	0.90	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorodecanoic acid (PFDA)	ND	1.9	0.79	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.87	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.69	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.4	1.9	0.77	ng/L	1	L-07	SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.9	0.76	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.9	0.99	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.90	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.78	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.98	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.96	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.97	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	1.0	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-1-butanesulfonamide (FBSA)	1.7	1.9	0.74	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorohexanesulfonic acid (PFHxS)	44	1.9	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.61	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	45	1.9	1.1	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoropentanesulfonic acid (PFPeS)	3.6	1.9	0.72	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.81	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoroheptanoic acid (PFHpA)	17	1.9	0.80	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorooctanoic acid (PFOA)	17	1.9	1.3	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorooctanesulfonic acid (PFOS)	65	1.9	0.80	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorononanoic acid (PFNA)	6.7	1.9	0.87	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW

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Project Location: Hyannis, MA | Sample Description: | Work Order: 23E3794

Date Received: 5/30/2023

Field Sample #: ME-3 | Sampled: 5/26/2023 08:50

Sample ID: 23E3794-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	8.2	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorobutanesulfonic acid (PFBS)	1.7	1.8	0.66	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoropentanoic acid (PFPeA)	23	1.8	0.71	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorohexanoic acid (PFHxA)	18	1.8	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorodecanoic acid (PFDA)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.83	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.2	1.8	0.73	ng/L	1	L-07	SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.72	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.85	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.69	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorooctanesulfonamide (FOSA)	11	1.8	0.91	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	1.9	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-1-butanesulfonamide (FBSA)	0.91	1.8	0.70	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorohexanesulfonic acid (PFHxS)	34	1.8	0.64	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.64	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.58	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	2.7	1.8	1.1	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.1	1.8	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoroheptanoic acid (PFHpA)	8.6	1.8	0.75	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorooctanoic acid (PFOA)	14	1.8	1.2	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorooctanesulfonic acid (PFOS)	83	1.8	0.76	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorononanoic acid (PFNA)	6.1	1.8	0.83	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW

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Sample Extraction Data

Prep Method:SOP 454-PFAAS **Analytical Method:SOP-454 PFAS**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23E3794-01RE1 [ME-1]	B342713	276	1.00	06/13/23
23E3794-02RE1 [ME-2]	B342713	264	1.00	06/13/23
23E3794-03RE1 [ME-3]	B342713	279	1.00	06/13/23

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B342713 - SOP 454-PFAAS										
Blank (B342713-BLK1)				Prepared: 06/13/23 Analyzed: 06/15/23						
Perfluorobutanoic acid (PFBA)	ND	2.1	ng/L							
Perfluorobutanesulfonic acid (PFBS)	ND	2.1	ng/L							
Perfluoropentanoic acid (PFPeA)	ND	2.1	ng/L							
Perfluorohexanoic acid (PFHxA)	ND	2.1	ng/L							
11Cl-PF3OUdS (F53B Major)	ND	2.1	ng/L							
9Cl-PF3ONS (F53B Minor)	ND	2.1	ng/L							
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.1	ng/L							
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.1	ng/L							
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.1	ng/L							
Perfluorodecanoic acid (PFDA)	ND	2.1	ng/L							
Perfluorododecanoic acid (PFDoA)	ND	2.1	ng/L							
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.1	ng/L							
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.1	ng/L							
N-EtFOSAA (NEtFOSAA)	ND	2.1	ng/L							
N-MeFOSAA (NMeFOSAA)	ND	2.1	ng/L							
Perfluorotetradecanoic acid (PFTA)	ND	2.1	ng/L							
Perfluorotridecanoic acid (PFTrDA)	ND	2.1	ng/L							
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.1	ng/L							
Perfluorodecanesulfonic acid (PFDS)	ND	2.1	ng/L							
Perfluorooctanesulfonamide (FOSA)	ND	2.1	ng/L							
Perfluorononanesulfonic acid (PFNS)	ND	2.1	ng/L							
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.1	ng/L							
Perfluoro-1-butanesulfonamide (FBSA)	ND	2.1	ng/L							
Perfluorohexanesulfonic acid (PFHxS)	ND	2.1	ng/L							
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.1	ng/L							
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.1	ng/L							
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.1	ng/L							
Perfluoropentanesulfonic acid (PFPeS)	ND	2.1	ng/L							
Perfluoroundecanoic acid (PFUnA)	ND	2.1	ng/L							
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.1	ng/L							
Perfluoroheptanoic acid (PFHpA)	ND	2.1	ng/L							
Perfluorooctanoic acid (PFOA)	ND	2.1	ng/L							
Perfluorooctanesulfonic acid (PFOS)	ND	2.1	ng/L							
Perfluorononanoic acid (PFNA)	ND	2.1	ng/L							
LCS (B342713-BS1)				Prepared: 06/13/23 Analyzed: 06/15/23						
Perfluorobutanoic acid (PFBA)	10.3	2.0	ng/L	10.2		102	73-129			
Perfluorobutanesulfonic acid (PFBS)	9.03	2.0	ng/L	8.99		100	72-130			
Perfluoropentanoic acid (PFPeA)	10.3	2.0	ng/L	10.2		101	72-129			
Perfluorohexanoic acid (PFHxA)	10.5	2.0	ng/L	10.2		103	72-129			
11Cl-PF3OUdS (F53B Major)	9.20	2.0	ng/L	9.57		96.1	55.1-141			
9Cl-PF3ONS (F53B Minor)	8.88	2.0	ng/L	9.47		93.7	59.6-146			
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	9.47	2.0	ng/L	9.57		99.0	60.3-131			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	9.74	2.0	ng/L	10.2		95.9	37.6-167			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	9.64	2.0	ng/L	9.75		98.8	67-138			
Perfluorodecanoic acid (PFDA)	10.6	2.0	ng/L	10.2		104	71-129			
Perfluorododecanoic acid (PFDoA)	11.9	2.0	ng/L	10.2		117	72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	8.89	2.0	ng/L	9.04		98.4	49.4-154			

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B342713 - SOP 454-PFAAS											
LCS (B342713-BS1)				Prepared: 06/13/23 Analyzed: 06/15/23							
Perfluoroheptanesulfonic acid (PFHpS)	10.5	2.0	ng/L	9.70		108		69-134			
N-EtFOSAA (NEtFOSAA)	11.4	2.0	ng/L	10.2		112		61-135			
N-MeFOSAA (NMeFOSAA)	11.9	2.0	ng/L	10.2		117		65-136			
Perfluorotetradecanoic acid (PFTA)	10.7	2.0	ng/L	10.2		105		71-132			
Perfluorotridecanoic acid (PFTrDA)	11.7	2.0	ng/L	10.2		115		65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	9.63	2.0	ng/L	9.50		101		63-143			
Perfluorodecanesulfonic acid (PFDS)	7.82	2.0	ng/L	9.80		79.7		53-142			
Perfluorooctanesulfonamide (FOSA)	10.8	2.0	ng/L	10.2		107		67-137			
Perfluorononanesulfonic acid (PFNS)	8.87	2.0	ng/L	9.75		90.9		69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	9.25	2.0	ng/L	10.2		91.1		61.7-156			
Perfluoro-1-butanesulfonamide (FBSA)	9.18	2.0	ng/L	10.2		90.4		61.3-145			
Perfluorohexanesulfonic acid (PFHxS)	8.78	2.0	ng/L	9.30		94.4		68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	10.4	2.0	ng/L	10.2		103		59.8-147			
Perfluoro-5-oxahexanoic acid (PFMBA)	10.0	2.0	ng/L	10.2		98.8		59.5-146			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	10.6	2.0	ng/L	9.65		110		64-140			
Perfluoropentanesulfonic acid (PFPeS)	9.72	2.0	ng/L	9.55		102		71-127			
Perfluoroundecanoic acid (PFUnA)	10.2	2.0	ng/L	10.2		100		69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	11.3	2.0	ng/L	10.2		111		58.5-143			
Perfluoroheptanoic acid (PFHpA)	10.4	2.0	ng/L	10.2		103		72-130			
Perfluorooctanoic acid (PFOA)	10.7	2.0	ng/L	10.2		105		71-133			
Perfluorooctanesulfonic acid (PFOS)	9.66	2.0	ng/L	9.40		103		65-140			
Perfluorononanoic acid (PFNA)	10.1	2.0	ng/L	10.2		99.7		69-130			
LCS Dup (B342713-BSD1)				Prepared: 06/13/23 Analyzed: 06/15/23							
Perfluorobutanoic acid (PFBA)	11.4	2.1	ng/L	10.5		109		73-129	9.93	30	
Perfluorobutanesulfonic acid (PFBS)	10.2	2.1	ng/L	9.26		110		72-130	12.3	30	
Perfluoropentanoic acid (PFPeA)	11.5	2.1	ng/L	10.5		109		72-129	10.8	30	
Perfluorohexanoic acid (PFHxA)	11.5	2.1	ng/L	10.5		110		72-129	9.29	30	
11Cl-PF3OUdS (F53B Major)	9.22	2.1	ng/L	9.86		93.5		55.1-141	0.252	30	
9Cl-PF3ONS (F53B Minor)	10.2	2.1	ng/L	9.76		105		59.6-146	13.9	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	10.5	2.1	ng/L	9.86		107		60.3-131	10.5	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	9.16	2.1	ng/L	10.5		87.6		37.6-167	6.15	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	12.6	2.1	ng/L	10.0		125		67-138	26.6	30	
Perfluorodecanoic acid (PFDA)	11.3	2.1	ng/L	10.5		108		71-129	6.41	30	
Perfluorododecanoic acid (PFDoA)	11.4	2.1	ng/L	10.5		109		72-134	3.79	30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	10.1	2.1	ng/L	9.32		108		49.4-154	12.3	30	
Perfluoroheptanesulfonic acid (PFHpS)	13.6	2.1	ng/L	10.0		**137**	*	69-134	26.4	30	L-07
N-EtFOSAA (NEtFOSAA)	12.3	2.1	ng/L	10.5		118		61-135	7.96	30	
N-MeFOSAA (NMeFOSAA)	12.9	2.1	ng/L	10.5		123		65-136	7.82	30	
Perfluorotetradecanoic acid (PFTA)	11.6	2.1	ng/L	10.5		111		71-132	8.45	30	
Perfluorotridecanoic acid (PFTrDA)	11.5	2.1	ng/L	10.5		110		65-144	1.59	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	10.3	2.1	ng/L	9.79		106		63-143	7.08	30	
Perfluorodecanesulfonic acid (PFDS)	8.99	2.1	ng/L	10.1		89.0		53-142	14.0	30	
Perfluorooctanesulfonamide (FOSA)	11.6	2.1	ng/L	10.5		111		67-137	6.57	30	
Perfluorononanesulfonic acid (PFNS)	11.5	2.1	ng/L	10.0		115		69-127	25.9	30	
Perfluoro-1-hexanesulfonamide (FHxSA)	10.6	2.1	ng/L	10.5		101		61.7-156	13.3	30	
Perfluoro-1-butanesulfonamide (FBSA)	10.7	2.1	ng/L	10.5		102		61.3-145	15.0	30	
Perfluorohexanesulfonic acid (PFHxS)	10.5	2.1	ng/L	9.58		109		68-131	17.6	30	
Perfluoro-4-oxapentanoic acid (PFMPA)	11.7	2.1	ng/L	10.5		111		59.8-147	11.2	30	
Perfluoro-5-oxahexanoic acid (PFMBA)	11.3	2.1	ng/L	10.5		108		59.5-146	12.3	30	

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B342713 - SOP 454-PFAAS										
LCS Dup (B342713-BSD1)				Prepared: 06/13/23 Analyzed: 06/15/23						
6:2 Fluorotelomersulfonic acid (6:2FTS A)	9.81	2.1	ng/L	9.94		98.6	64-140	8.13	30	
Perfluoropentanesulfonic acid (PFPeS)	11.0	2.1	ng/L	9.84		112	71-127	12.7	30	
Perfluoroundecanoic acid (PFUnA)	11.4	2.1	ng/L	10.5		109	69-133	11.4	30	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	12.4	2.1	ng/L	10.5		119	58.5-143	9.68	30	
Perfluoroheptanoic acid (PFHpA)	11.1	2.1	ng/L	10.5		106	72-130	5.87	30	
Perfluorooctanoic acid (PFOA)	11.2	2.1	ng/L	10.5		107	71-133	4.69	30	
Perfluorooctanesulfonic acid (PFOS)	11.1	2.1	ng/L	9.68		114	65-140	13.7	30	
Perfluorononanoic acid (PFNA)	11.3	2.1	ng/L	10.5		108	69-130	11.0	30	

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-07	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.
S-29	Extracted Internal Standard is outside of control limits.

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
ME-1 (23E3794-01RE1)			Lab File ID: 23E3794-01RE1.d			Analyzed: 06/15/23 16:52			
M8FOSA	213334.6	3.980567	227,522.00	3.980567	94	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	28486.3	2.562517	27,028.00	2.562517	105	50 - 150	0.0000	+/-0.50	
M2PFTA	355459	4.329667	479,880.00	4.329667	74	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	37332.14	3.794817	33,212.00	3.802783	112	50 - 150	-0.0080	+/-0.50	
MPFBA	231042	1.066783	256,957.00	1.058467	90	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	102523.9	2.880217	114,902.00	2.880217	89	50 - 150	0.0000	+/-0.50	
M6PFDA	449810.7	3.795333	445,919.00	3.795333	101	50 - 150	0.0000	+/-0.50	
M3PFBS	110999.1	1.944683	104,197.00	1.9364	107	50 - 150	0.0083	+/-0.50	
M7PFUnA	450689.3	3.946033	453,308.00	3.946017	99	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	43785.91	3.445283	27,565.00	3.445283	159	50 - 150	0.0000	+/-0.50	*
M5PFPeA	271434.3	1.757717	276,869.00	1.757717	98	50 - 150	0.0000	+/-0.50	
M5PFHxA	467718.8	2.655	458,596.00	2.646767	102	50 - 150	0.0082	+/-0.50	
M3PFHxS	77050.47	3.218333	68,806.00	3.218333	112	50 - 150	0.0000	+/-0.50	
M4PFHpA	500292.4	3.186933	461,168.00	3.186933	108	50 - 150	0.0000	+/-0.50	
M8PFOA	548914.8	3.453817	508,809.00	3.453817	108	50 - 150	0.0000	+/-0.50	
M8PFOS	76850.11	3.636183	76,995.00	3.636183	100	50 - 150	0.0000	+/-0.50	
M9PFNA	512879.3	3.637217	526,406.00	3.637217	97	50 - 150	0.0000	+/-0.50	
MPFDoA	361032.2	4.088634	386,713.00	4.088634	93	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	91828.38	3.9535	101,789.00	3.9535	90	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	107819.7	3.873767	116,586.00	3.873767	92	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
ME-2 (23E3794-02RE1)			Lab File ID: 23E3794-02RE1.d			Analyzed: 06/15/23 16:59			
M8FOSA	63430.73	3.980567	227,522.00	3.980567	28	50 - 150	0.0000	+/-0.50	*
M2-4:2FTS	24893.35	2.562517	27,028.00	2.562517	92	50 - 150	0.0000	+/-0.50	
M2PFTA	364628.1	4.329667	479,880.00	4.329667	76	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	31018.9	3.794817	33,212.00	3.802783	93	50 - 150	-0.0080	+/-0.50	
MPFBA	216959.8	1.058467	256,957.00	1.058467	84	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	98515.74	2.880217	114,902.00	2.880217	86	50 - 150	0.0000	+/-0.50	
M6PFDA	380677.3	3.795333	445,919.00	3.795333	85	50 - 150	0.0000	+/-0.50	
M3PFBS	99833.68	1.9364	104,197.00	1.9364	96	50 - 150	0.0000	+/-0.50	
M7PFUnA	358386.6	3.946033	453,308.00	3.946017	79	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	37812.95	3.437283	27,565.00	3.445283	137	50 - 150	-0.0080	+/-0.50	
M5PFPeA	250487.6	1.757717	276,869.00	1.757717	90	50 - 150	0.0000	+/-0.50	
M5PFHxA	423755.1	2.655	458,596.00	2.646767	92	50 - 150	0.0082	+/-0.50	
M3PFHxS	69592.15	3.218333	68,806.00	3.218333	101	50 - 150	0.0000	+/-0.50	
M4PFHpA	456410.2	3.186933	461,168.00	3.186933	99	50 - 150	0.0000	+/-0.50	
M8PFOA	478276.5	3.453817	508,809.00	3.453817	94	50 - 150	0.0000	+/-0.50	
M8PFOS	68816.74	3.636183	76,995.00	3.636183	89	50 - 150	0.0000	+/-0.50	
M9PFNA	474013.9	3.637217	526,406.00	3.637217	90	50 - 150	0.0000	+/-0.50	
MPFDoA	295467.7	4.088634	386,713.00	4.088634	76	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	71346.97	3.9535	101,789.00	3.9535	70	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	82685.68	3.873767	116,586.00	3.873767	71	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
ME-3 (23E3794-03RE1)			Lab File ID: 23E3794-03RE1.d			Analyzed: 06/15/23 17:06			
M8FOSA	166835.3	3.980567	227,522.00	3.980567	73	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	24394.43	2.562517	27,028.00	2.562517	90	50 - 150	0.0000	+/-0.50	
M2PFTA	343507.3	4.329667	479,880.00	4.329667	72	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	29683.95	3.794817	33,212.00	3.802783	89	50 - 150	-0.0080	+/-0.50	
MPFBA	199579.7	1.066783	256,957.00	1.058467	78	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	95104.96	2.880217	114,902.00	2.880217	83	50 - 150	0.0000	+/-0.50	
M6PFDA	375022.2	3.795333	445,919.00	3.795333	84	50 - 150	0.0000	+/-0.50	
M3PFBS	92953.21	1.9364	104,197.00	1.9364	89	50 - 150	0.0000	+/-0.50	
M7PFUnA	351270.3	3.946033	453,308.00	3.946017	77	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	31350.92	3.437283	27,565.00	3.445283	114	50 - 150	-0.0080	+/-0.50	
M5PFPeA	231561.3	1.757717	276,869.00	1.757717	84	50 - 150	0.0000	+/-0.50	
M5PFHxA	392931.2	2.646767	458,596.00	2.646767	86	50 - 150	0.0000	+/-0.50	
M3PFHxS	64172.11	3.218333	68,806.00	3.218333	93	50 - 150	0.0000	+/-0.50	
M4PFHpA	411807.9	3.186933	461,168.00	3.186933	89	50 - 150	0.0000	+/-0.50	
M8PFOA	450823.7	3.453817	508,809.00	3.453817	89	50 - 150	0.0000	+/-0.50	
M8PFOS	64565.88	3.636183	76,995.00	3.636183	84	50 - 150	0.0000	+/-0.50	
M9PFNA	438212.4	3.637217	526,406.00	3.637217	83	50 - 150	0.0000	+/-0.50	
MPFDoA	287448.7	4.088634	386,713.00	4.088634	74	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	80767.51	3.9535	101,789.00	3.9535	79	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	82407.26	3.873767	116,586.00	3.873767	71	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B342713-BLK1)			Lab File ID: B342713-BLK1.d			Analyzed: 06/15/23 16:01			
M8FOSA	196862.9	3.980567	227,522.00	3.980567	87	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	26152.61	2.562517	27,028.00	2.562517	97	50 - 150	0.0000	+/-0.50	
M2PFTA	427562.6	4.337783	479,880.00	4.329667	89	50 - 150	0.0081	+/-0.50	
M2-8:2FTS	29892	3.794817	33,212.00	3.802783	90	50 - 150	-0.0080	+/-0.50	
MPFBA	249440.2	1.058467	256,957.00	1.058467	97	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	94002.9	2.880217	114,902.00	2.880217	82	50 - 150	0.0000	+/-0.50	
M6PFDA	409812.8	3.795333	445,919.00	3.795333	92	50 - 150	0.0000	+/-0.50	
M3PFBS	105955.5	1.944683	104,197.00	1.9364	102	50 - 150	0.0083	+/-0.50	
M7PFUnA	426348.8	3.946017	453,308.00	3.946017	94	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	26142.75	3.437283	27,565.00	3.445283	95	50 - 150	-0.0080	+/-0.50	
M5PFPeA	274971.8	1.757717	276,869.00	1.757717	99	50 - 150	0.0000	+/-0.50	
M5PFHxA	449201.1	2.655	458,596.00	2.646767	98	50 - 150	0.0082	+/-0.50	
M3PFHxS	65679.15	3.218333	68,806.00	3.218333	95	50 - 150	0.0000	+/-0.50	
M4PFHpA	468079.8	3.186933	461,168.00	3.186933	101	50 - 150	0.0000	+/-0.50	
M8PFOA	511877	3.453817	508,809.00	3.453817	101	50 - 150	0.0000	+/-0.50	
M8PFOS	68250.95	3.636183	76,995.00	3.636183	89	50 - 150	0.0000	+/-0.50	
M9PFNA	486195.3	3.637217	526,406.00	3.637217	92	50 - 150	0.0000	+/-0.50	
MPFDoA	361203.5	4.088634	386,713.00	4.088634	93	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	91567.28	3.9535	101,789.00	3.9535	90	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	109350.9	3.873767	116,586.00	3.873767	94	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B342713-BS1)			Lab File ID: B342713-BS1.d			Analyzed: 06/15/23 15:47			
M8FOSA	177957.5	3.980567	227,522.00	3.980567	78	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	29196.96	2.562517	27,028.00	2.562517	108	50 - 150	0.0000	+/-0.50	
M2PFTA	408424.1	4.329667	479,880.00	4.329667	85	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	28086.29	3.794817	33,212.00	3.802783	85	50 - 150	-0.0080	+/-0.50	
MPFBA	252572.1	1.058467	256,957.00	1.058467	98	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	97688.41	2.880217	114,902.00	2.880217	85	50 - 150	0.0000	+/-0.50	
M6PFDA	395000.1	3.795333	445,919.00	3.795333	89	50 - 150	0.0000	+/-0.50	
M3PFBS	107557.4	1.944683	104,197.00	1.9364	103	50 - 150	0.0083	+/-0.50	
M7PFUnA	394744.1	3.946033	453,308.00	3.946017	87	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	28605.05	3.437283	27,565.00	3.445283	104	50 - 150	-0.0080	+/-0.50	
M5PFPeA	274098.7	1.757717	276,869.00	1.757717	99	50 - 150	0.0000	+/-0.50	
M5PFHxA	460367.3	2.655	458,596.00	2.646767	100	50 - 150	0.0082	+/-0.50	
M3PFHxS	71050.67	3.218333	68,806.00	3.218333	103	50 - 150	0.0000	+/-0.50	
M4PFHpA	467747.6	3.186933	461,168.00	3.186933	101	50 - 150	0.0000	+/-0.50	
M8PFOA	513461.1	3.453817	508,809.00	3.453817	101	50 - 150	0.0000	+/-0.50	
M8PFOS	69476.79	3.636183	76,995.00	3.636183	90	50 - 150	0.0000	+/-0.50	
M9PFNA	496207.2	3.637217	526,406.00	3.637217	94	50 - 150	0.0000	+/-0.50	
MPFDoA	315758.9	4.088634	386,713.00	4.088634	82	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	89045.16	3.9535	101,789.00	3.9535	87	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	94363.59	3.873767	116,586.00	3.873767	81	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS Dup (B342713-BSD1)			Lab File ID: B342713-BSD1.d			Analyzed: 06/15/23 15:54			
M8FOSA	220138.8	3.980567	227,522.00	3.980567	97	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	32367.33	2.562517	27,028.00	2.562517	120	50 - 150	0.0000	+/-0.50	
M2PFTA	441651.6	4.329667	479,880.00	4.329667	92	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	31301.99	3.794817	33,212.00	3.802783	94	50 - 150	-0.0080	+/-0.50	
MPFBA	272321.5	1.058467	256,957.00	1.058467	106	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	118835	2.880217	114,902.00	2.880217	103	50 - 150	0.0000	+/-0.50	
M6PFDA	437059.7	3.795333	445,919.00	3.795333	98	50 - 150	0.0000	+/-0.50	
M3PFBS	114906.1	1.944683	104,197.00	1.9364	110	50 - 150	0.0083	+/-0.50	
M7PFUnA	421543.8	3.946033	453,308.00	3.946017	93	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	32375.59	3.437283	27,565.00	3.445283	117	50 - 150	-0.0080	+/-0.50	
M5PFPeA	296427	1.757717	276,869.00	1.757717	107	50 - 150	0.0000	+/-0.50	
M5PFHxA	497145.6	2.655	458,596.00	2.646767	108	50 - 150	0.0082	+/-0.50	
M3PFHxS	73935.12	3.218333	68,806.00	3.218333	107	50 - 150	0.0000	+/-0.50	
M4PFHpA	510817.8	3.186933	461,168.00	3.186933	111	50 - 150	0.0000	+/-0.50	
M8PFOA	559667.8	3.453817	508,809.00	3.453817	110	50 - 150	0.0000	+/-0.50	
M8PFOS	74508.68	3.636183	76,995.00	3.636183	97	50 - 150	0.0000	+/-0.50	
M9PFNA	545909.5	3.637217	526,406.00	3.637217	104	50 - 150	0.0000	+/-0.50	
MPFDoA	347648.5	4.088634	386,713.00	4.088634	90	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	93566.37	3.9535	101,789.00	3.9535	92	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	109406.2	3.873767	116,586.00	3.873767	94	50 - 150	0.0000	+/-0.50	

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SOP-454 PFAS in Water	
Perfluorobutanoic acid (PFBA)	NH-P,PA
Perfluorobutanesulfonic acid (PFBS)	NH-P,PA
Perfluoropentanoic acid (PFPeA)	NH-P,PA
Perfluorohexanoic acid (PFHxA)	NH-P,PA
11Cl-PF3OUdS (F53B Major)	NH-P,PA
9Cl-PF3ONS (F53B Minor)	NH-P,PA
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	NH-P,PA
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P,PA
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P,PA
Perfluorodecanoic acid (PFDA)	NH-P,PA
Perfluorododecanoic acid (PFDoA)	NH-P,PA
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	NH-P,PA
Perfluoroheptanesulfonic acid (PFHpS)	NH-P,PA
N-EtFOSAA (NEtFOSAA)	NH-P,PA
N-MeFOSAA (NMeFOSAA)	NH-P,PA
Perfluorotetradecanoic acid (PFTA)	NH-P,PA
Perfluorotridecanoic acid (PFTrDA)	NH-P,PA
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P,PA
Perfluorodecanesulfonic acid (PFDS)	NH-P,PA
Perfluorooctanesulfonamide (FOSA)	NH-P,PA
Perfluorononanesulfonic acid (PFNS)	NH-P,PA
Perfluoro-1-hexanesulfonamide (FHxSA)	NH-P,PA
Perfluoro-1-butanesulfonamide (FBSA)	NH-P,PA
Perfluorohexanesulfonic acid (PFHxS)	NH-P,PA
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P,PA
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P,PA
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P,PA
Perfluoropentanesulfonic acid (PFPeS)	NH-P,PA
Perfluoroundecanoic acid (PFUnA)	NH-P,PA
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P,PA
Perfluoroheptanoic acid (PFHpA)	NH-P,PA
Perfluorooctanoic acid (PFOA)	NH-P,PA
Perfluorooctanesulfonic acid (PFOS)	NH-P,PA
Perfluorononanoic acid (PFNA)	NH-P,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2023
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2024

23E3794 KAF

Pace Analytical

Phone: 413-525-2332
Fax: 413-525-6405
Access COC's and Support Requests

http://www.pacelabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 1

Company Name:	Horsley Witten Group
Address:	90 Route 6A Sandwich, MA
Phone:	508-833-6600
Project Name:	HYA
Project Location:	Hyannis, MA
Project Number:	
Project Manager:	Bryan Massa
Pace Quote Name/Number:	
Invoice Recipient:	bmassa@horsleywitten.com
Sampled By:	Caroline Armstrong

Requested Turnaround Time

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☒ Due Date:

Rush-Approval Required

1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery

Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To:
Fax To #:

Dissolved Metals Samples

○ Field Filtered
○ Lab to Filter

Orthophosphate Samples

○ Field Filtered
○ Lab to Filter

PCB ONLY

SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PFAS (Isotope dilution)
1	ME-1	5/20/23	845	G	W				2			X
2	ME-2	↓	855	G	W				2			X
3	ME-3		850	G	W				2			X

[2] Preservation Code

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N

Glassware in freezer? Y / N

Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time: 5/30/23 1143	Client Comments:
Received by: (signature) PACE	Date/Time: 5/30/23 1143	
Relinquished by: (signature)	Date/Time: 5/30/23 1606	
Received by: (signature)	Date/Time: 5/30/23 1606	
Relinquished by: (signature)	Date/Time:	
Received by: (signature)	Date/Time:	
Relinquished by: (signature)	Date/Time:	
Received by: (signature)	Date/Time:	

Detection Limit Requirements

MA GW-1
GT
Other:

Special Requirements

☑ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity

Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other

☐ Chromatogram
☐ AIHA-LAP,LLC

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

39 Spruce St.
East Longmeadow, MA. 01028
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F:413-525-6405
www.pacelabs.com

ENV-FRM-ELON-0001 V05__Sample Receiving Checklist

Log In Back-Sheet

Login Sample Receipt Checklist – (Rejection Criteria Listing – Using Acceptance Policy) Any False statement will be brought to the attention of the Client – True or False

Pace
PEOPLE ADVANCING SCIENCE

Client Horsley Witten Group

Project HYA

MCP/RCP Required MA MCP

Deliverable Package Requirement CAM-1

Location Hyannis, MA

PWSID# (When Applicable) NA

Arrival Method:

Courier ☑ Fed Ex ☐ Walk In ☐ Other ☐

Received By / Date / Time GL 5/30/23 1606

~~Back-Sheet By / Date / Time~~ GL 5/30/23 1857

Temperature Method GUN # 2

Temp ☑ < 6° C Actual Temperature 2.4

Rush Samples: Yes / (No) Notify

Short Hold: Yes / (No) Notify

	True	False
Received on Ice	☑	☐
Received in Cooler	☑	☐
Custody Seal: DATE TIME	☐	☑
COC Relinquished	☑	☐
COC/Samples Labels Agree	☑	☐
All Samples in Good Condition	☑	☐
Samples Received within Holding Time	☑	☐
~~Is there enough Volume~~	☑	☐
Proper Media/Container Used	☑	☐
Splitting Samples Required	☐	☑
MS/MSD	☐	☑
Trip Blanks	☐	☑
Lab to Filters	☐	☑
COC Legible	☑	☐

COC Included: (Check all included)

Client ☑ Analysis ☑ Sampler Name ☑

Project ☑ IDs ☑ Collection Date/Time ☑

All Samples Proper pH: (N/A) ☐ ☐

Notes regarding Samples/COC outside of SOP:

Additional Container Notes

Sample	Soils Jars (Circle Amb/Clear)				Ambers							Plastics										VOA Vials					Other / Fill in					
					1 Liter			250mL			100mL	1 Liter		500mL		250mL																
	16oz Amb/Clear	8oz Amb/Clear	4oz Amb/Clear	2oz Amb/Clear	Unpreserved	HCL	Sulfuric	Sulfuric	Phosphoric	HCl	Unpreserved	Unpreserved	Sulfuric	Unpreserved	Sulfuric	Unpreserved	Trizma	Sulfuric	Nitric	NaOH	NaOH/Zinc	Unpreserved	HCl	MeOH	D.I. Water	BiSulfate	Col/Bact					
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June 20, 2023

Bryan Massa
Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563

Project Location: Hyannis, MA
Client Job Number:
Project Number: 22071
Laboratory Work Order Number: 23E3794

Enclosed are results of analyses for samples as received by the laboratory on May 30, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kaitlyn A. Feliciano
Project Manager

Table of Contents

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563
ATTN: Bryan Massa

REPORT DATE: 6/20/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 22071

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23E3794

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Hyannis, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
ME-1	23E3794-01	Ground Water		SOP-454 PFAS	
ME-2	23E3794-02	Ground Water		SOP-454 PFAS	
ME-3	23E3794-03	Ground Water		SOP-454 PFAS	

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CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SOP-454 PFAS

Qualifications:

L-07

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.

Analyte & Samples(s) Qualified:

Perfluoroheptanesulfonic acid (PFHpS)
23E3794-01RE1[ME-1], 23E3794-02RE1[ME-2], 23E3794-03RE1[ME-3], B342713-BSD1

S-29

Extracted Internal Standard is outside of control limits.

Analyte & Samples(s) Qualified:

M2-6:2FTS
23E3794-01RE1[ME-1]

M2-8:2FTS
S088753-CCV1

M8FOSA
23E3794-02RE1[ME-2]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Meghan E. Kelley
Reporting Specialist

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Hyannis, MA | Sample Description: | Work Order: 23E3794

Date Received: 5/30/2023

Field Sample #: ME-1 | Sampled: 5/26/2023 08:45

Sample ID: 23E3794-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	19	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorobutanesulfonic acid (PFBS)	2.5	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoropentanoic acid (PFPeA)	60	1.8	0.72	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorohexanoic acid (PFHxA)	38	1.8	0.74	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.87	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorodecanoic acid (PFDA)	0.83	1.8	0.75	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.84	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.0	1.8	0.74	ng/L	1	L-07	SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.95	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-1-butanesulfonamide (FBSA)	1.3	1.8	0.71	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorohexanesulfonic acid (PFHxS)	29	1.8	0.65	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.65	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.59	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	43	1.8	1.1	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.4	1.8	0.69	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoroheptanoic acid (PFHpA)	18	1.8	0.76	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorooctanoic acid (PFOA)	18	1.8	1.2	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorooctanesulfonic acid (PFOS)	69	1.8	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorononanoic acid (PFNA)	11	1.8	0.84	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW

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Project Location: Hyannis, MA | Sample Description: | Work Order: 23E3794

Date Received: 5/30/2023

Field Sample #: ME-2 | Sampled: 5/26/2023 08:55

Sample ID: 23E3794-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	16	1.9	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorobutanesulfonic acid (PFBS)	4.2	1.9	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoropentanoic acid (PFPeA)	54	1.9	0.75	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorohexanoic acid (PFHxA)	40	1.9	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.9	0.71	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.9	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.98	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.56	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	5.7	1.9	0.90	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorodecanoic acid (PFDA)	ND	1.9	0.79	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.87	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.69	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.4	1.9	0.77	ng/L	1	L-07	SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.9	0.76	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.9	0.99	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.90	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.78	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.98	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.96	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.97	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	1.0	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-1-butanesulfonamide (FBSA)	1.7	1.9	0.74	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorohexanesulfonic acid (PFHxS)	44	1.9	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.61	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	45	1.9	1.1	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoropentanesulfonic acid (PFPeS)	3.6	1.9	0.72	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.81	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoroheptanoic acid (PFHpA)	17	1.9	0.80	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorooctanoic acid (PFOA)	17	1.9	1.3	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorooctanesulfonic acid (PFOS)	65	1.9	0.80	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorononanoic acid (PFNA)	6.7	1.9	0.87	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW

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Project Location: Hyannis, MA | Sample Description: | Work Order: 23E3794

Date Received: 5/30/2023

Field Sample #: ME-3 | Sampled: 5/26/2023 08:50

Sample ID: 23E3794-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	8.2	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorobutanesulfonic acid (PFBS)	1.7	1.8	0.66	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoropentanoic acid (PFPeA)	23	1.8	0.71	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorohexanoic acid (PFHxA)	18	1.8	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorodecanoic acid (PFDA)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.83	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.2	1.8	0.73	ng/L	1	L-07	SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.72	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.85	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.69	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorooctanesulfonamide (FOSA)	11	1.8	0.91	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	1.9	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-1-butanesulfonamide (FBSA)	0.91	1.8	0.70	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorohexanesulfonic acid (PFHxS)	34	1.8	0.64	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.64	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.58	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	2.7	1.8	1.1	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.1	1.8	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoroheptanoic acid (PFHpA)	8.6	1.8	0.75	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorooctanoic acid (PFOA)	14	1.8	1.2	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorooctanesulfonic acid (PFOS)	83	1.8	0.76	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorononanoic acid (PFNA)	6.1	1.8	0.83	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW

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Sample Extraction Data

Prep Method:SOP 454-PFAAS **Analytical Method:SOP-454 PFAS**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23E3794-01RE1 [ME-1]	B342713	276	1.00	06/13/23
23E3794-02RE1 [ME-2]	B342713	264	1.00	06/13/23
23E3794-03RE1 [ME-3]	B342713	279	1.00	06/13/23

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B342713 - SOP 454-PFAAS										
Blank (B342713-BLK1)				Prepared: 06/13/23 Analyzed: 06/15/23						
Perfluorobutanoic acid (PFBA)	ND	2.1	ng/L							
Perfluorobutanesulfonic acid (PFBS)	ND	2.1	ng/L							
Perfluoropentanoic acid (PFPeA)	ND	2.1	ng/L							
Perfluorohexanoic acid (PFHxA)	ND	2.1	ng/L							
11Cl-PF3OUdS (F53B Major)	ND	2.1	ng/L							
9Cl-PF3ONS (F53B Minor)	ND	2.1	ng/L							
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.1	ng/L							
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.1	ng/L							
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.1	ng/L							
Perfluorodecanoic acid (PFDA)	ND	2.1	ng/L							
Perfluorododecanoic acid (PFDoA)	ND	2.1	ng/L							
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.1	ng/L							
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.1	ng/L							
N-EtFOSAA (NEtFOSAA)	ND	2.1	ng/L							
N-MeFOSAA (NMeFOSAA)	ND	2.1	ng/L							
Perfluorotetradecanoic acid (PFTA)	ND	2.1	ng/L							
Perfluorotridecanoic acid (PFTrDA)	ND	2.1	ng/L							
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.1	ng/L							
Perfluorodecanesulfonic acid (PFDS)	ND	2.1	ng/L							
Perfluorooctanesulfonamide (FOSA)	ND	2.1	ng/L							
Perfluorononanesulfonic acid (PFNS)	ND	2.1	ng/L							
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.1	ng/L							
Perfluoro-1-butanesulfonamide (FBSA)	ND	2.1	ng/L							
Perfluorohexanesulfonic acid (PFHxS)	ND	2.1	ng/L							
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.1	ng/L							
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.1	ng/L							
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.1	ng/L							
Perfluoropentanesulfonic acid (PFPeS)	ND	2.1	ng/L							
Perfluoroundecanoic acid (PFUnA)	ND	2.1	ng/L							
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.1	ng/L							
Perfluoroheptanoic acid (PFHpA)	ND	2.1	ng/L							
Perfluorooctanoic acid (PFOA)	ND	2.1	ng/L							
Perfluorooctanesulfonic acid (PFOS)	ND	2.1	ng/L							
Perfluorononanoic acid (PFNA)	ND	2.1	ng/L							
LCS (B342713-BS1)				Prepared: 06/13/23 Analyzed: 06/15/23						
Perfluorobutanoic acid (PFBA)	10.3	2.0	ng/L	10.2		102	73-129			
Perfluorobutanesulfonic acid (PFBS)	9.03	2.0	ng/L	8.99		100	72-130			
Perfluoropentanoic acid (PFPeA)	10.3	2.0	ng/L	10.2		101	72-129			
Perfluorohexanoic acid (PFHxA)	10.5	2.0	ng/L	10.2		103	72-129			
11Cl-PF3OUdS (F53B Major)	9.20	2.0	ng/L	9.57		96.1	55.1-141			
9Cl-PF3ONS (F53B Minor)	8.88	2.0	ng/L	9.47		93.7	59.6-146			
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	9.47	2.0	ng/L	9.57		99.0	60.3-131			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	9.74	2.0	ng/L	10.2		95.9	37.6-167			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	9.64	2.0	ng/L	9.75		98.8	67-138			
Perfluorodecanoic acid (PFDA)	10.6	2.0	ng/L	10.2		104	71-129			
Perfluorododecanoic acid (PFDoA)	11.9	2.0	ng/L	10.2		117	72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	8.89	2.0	ng/L	9.04		98.4	49.4-154			

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B342713 - SOP 454-PFAAS											
LCS (B342713-BS1)				Prepared: 06/13/23 Analyzed: 06/15/23							
Perfluoroheptanesulfonic acid (PFHpS)	10.5	2.0	ng/L	9.70		108		69-134			
N-EtFOSAA (NEtFOSAA)	11.4	2.0	ng/L	10.2		112		61-135			
N-MeFOSAA (NMeFOSAA)	11.9	2.0	ng/L	10.2		117		65-136			
Perfluorotetradecanoic acid (PFTA)	10.7	2.0	ng/L	10.2		105		71-132			
Perfluorotridecanoic acid (PFTrDA)	11.7	2.0	ng/L	10.2		115		65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	9.63	2.0	ng/L	9.50		101		63-143			
Perfluorodecanesulfonic acid (PFDS)	7.82	2.0	ng/L	9.80		79.7		53-142			
Perfluorooctanesulfonamide (FOSA)	10.8	2.0	ng/L	10.2		107		67-137			
Perfluorononanesulfonic acid (PFNS)	8.87	2.0	ng/L	9.75		90.9		69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	9.25	2.0	ng/L	10.2		91.1		61.7-156			
Perfluoro-1-butanesulfonamide (FBSA)	9.18	2.0	ng/L	10.2		90.4		61.3-145			
Perfluorohexanesulfonic acid (PFHxS)	8.78	2.0	ng/L	9.30		94.4		68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	10.4	2.0	ng/L	10.2		103		59.8-147			
Perfluoro-5-oxahexanoic acid (PFMBA)	10.0	2.0	ng/L	10.2		98.8		59.5-146			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	10.6	2.0	ng/L	9.65		110		64-140			
Perfluoropentanesulfonic acid (PFPeS)	9.72	2.0	ng/L	9.55		102		71-127			
Perfluoroundecanoic acid (PFUnA)	10.2	2.0	ng/L	10.2		100		69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	11.3	2.0	ng/L	10.2		111		58.5-143			
Perfluoroheptanoic acid (PFHpA)	10.4	2.0	ng/L	10.2		103		72-130			
Perfluorooctanoic acid (PFOA)	10.7	2.0	ng/L	10.2		105		71-133			
Perfluorooctanesulfonic acid (PFOS)	9.66	2.0	ng/L	9.40		103		65-140			
Perfluorononanoic acid (PFNA)	10.1	2.0	ng/L	10.2		99.7		69-130			
LCS Dup (B342713-BSD1)				Prepared: 06/13/23 Analyzed: 06/15/23							
Perfluorobutanoic acid (PFBA)	11.4	2.1	ng/L	10.5		109		73-129	9.93	30	
Perfluorobutanesulfonic acid (PFBS)	10.2	2.1	ng/L	9.26		110		72-130	12.3	30	
Perfluoropentanoic acid (PFPeA)	11.5	2.1	ng/L	10.5		109		72-129	10.8	30	
Perfluorohexanoic acid (PFHxA)	11.5	2.1	ng/L	10.5		110		72-129	9.29	30	
11Cl-PF3OUdS (F53B Major)	9.22	2.1	ng/L	9.86		93.5		55.1-141	0.252	30	
9Cl-PF3ONS (F53B Minor)	10.2	2.1	ng/L	9.76		105		59.6-146	13.9	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	10.5	2.1	ng/L	9.86		107		60.3-131	10.5	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	9.16	2.1	ng/L	10.5		87.6		37.6-167	6.15	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	12.6	2.1	ng/L	10.0		125		67-138	26.6	30	
Perfluorodecanoic acid (PFDA)	11.3	2.1	ng/L	10.5		108		71-129	6.41	30	
Perfluorododecanoic acid (PFDoA)	11.4	2.1	ng/L	10.5		109		72-134	3.79	30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	10.1	2.1	ng/L	9.32		108		49.4-154	12.3	30	
Perfluoroheptanesulfonic acid (PFHpS)	13.6	2.1	ng/L	10.0		**137**	*	69-134	26.4	30	L-07
N-EtFOSAA (NEtFOSAA)	12.3	2.1	ng/L	10.5		118		61-135	7.96	30	
N-MeFOSAA (NMeFOSAA)	12.9	2.1	ng/L	10.5		123		65-136	7.82	30	
Perfluorotetradecanoic acid (PFTA)	11.6	2.1	ng/L	10.5		111		71-132	8.45	30	
Perfluorotridecanoic acid (PFTrDA)	11.5	2.1	ng/L	10.5		110		65-144	1.59	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	10.3	2.1	ng/L	9.79		106		63-143	7.08	30	
Perfluorodecanesulfonic acid (PFDS)	8.99	2.1	ng/L	10.1		89.0		53-142	14.0	30	
Perfluorooctanesulfonamide (FOSA)	11.6	2.1	ng/L	10.5		111		67-137	6.57	30	
Perfluorononanesulfonic acid (PFNS)	11.5	2.1	ng/L	10.0		115		69-127	25.9	30	
Perfluoro-1-hexanesulfonamide (FHxSA)	10.6	2.1	ng/L	10.5		101		61.7-156	13.3	30	
Perfluoro-1-butanesulfonamide (FBSA)	10.7	2.1	ng/L	10.5		102		61.3-145	15.0	30	
Perfluorohexanesulfonic acid (PFHxS)	10.5	2.1	ng/L	9.58		109		68-131	17.6	30	
Perfluoro-4-oxapentanoic acid (PFMPA)	11.7	2.1	ng/L	10.5		111		59.8-147	11.2	30	
Perfluoro-5-oxahexanoic acid (PFMBA)	11.3	2.1	ng/L	10.5		108		59.5-146	12.3	30	

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B342713 - SOP 454-PFAAS										
LCS Dup (B342713-BSD1)				Prepared: 06/13/23 Analyzed: 06/15/23						
6:2 Fluorotelomersulfonic acid (6:2FTS A)	9.81	2.1	ng/L	9.94		98.6	64-140	8.13	30	
Perfluoropentanesulfonic acid (PFPeS)	11.0	2.1	ng/L	9.84		112	71-127	12.7	30	
Perfluoroundecanoic acid (PFUnA)	11.4	2.1	ng/L	10.5		109	69-133	11.4	30	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	12.4	2.1	ng/L	10.5		119	58.5-143	9.68	30	
Perfluoroheptanoic acid (PFHpA)	11.1	2.1	ng/L	10.5		106	72-130	5.87	30	
Perfluorooctanoic acid (PFOA)	11.2	2.1	ng/L	10.5		107	71-133	4.69	30	
Perfluorooctanesulfonic acid (PFOS)	11.1	2.1	ng/L	9.68		114	65-140	13.7	30	
Perfluorononanoic acid (PFNA)	11.3	2.1	ng/L	10.5		108	69-130	11.0	30	

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-07	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.
S-29	Extracted Internal Standard is outside of control limits.

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
ME-1 (23E3794-01RE1)			Lab File ID: 23E3794-01RE1.d			Analyzed: 06/15/23 16:52			
M8FOSA	213334.6	3.980567	227,522.00	3.980567	94	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	28486.3	2.562517	27,028.00	2.562517	105	50 - 150	0.0000	+/-0.50	
M2PFTA	355459	4.329667	479,880.00	4.329667	74	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	37332.14	3.794817	33,212.00	3.802783	112	50 - 150	-0.0080	+/-0.50	
MPFBA	231042	1.066783	256,957.00	1.058467	90	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	102523.9	2.880217	114,902.00	2.880217	89	50 - 150	0.0000	+/-0.50	
M6PFDA	449810.7	3.795333	445,919.00	3.795333	101	50 - 150	0.0000	+/-0.50	
M3PFBS	110999.1	1.944683	104,197.00	1.9364	107	50 - 150	0.0083	+/-0.50	
M7PFUnA	450689.3	3.946033	453,308.00	3.946017	99	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	43785.91	3.445283	27,565.00	3.445283	159	50 - 150	0.0000	+/-0.50	*
M5PFPeA	271434.3	1.757717	276,869.00	1.757717	98	50 - 150	0.0000	+/-0.50	
M5PFHxA	467718.8	2.655	458,596.00	2.646767	102	50 - 150	0.0082	+/-0.50	
M3PFHxS	77050.47	3.218333	68,806.00	3.218333	112	50 - 150	0.0000	+/-0.50	
M4PFHpA	500292.4	3.186933	461,168.00	3.186933	108	50 - 150	0.0000	+/-0.50	
M8PFOA	548914.8	3.453817	508,809.00	3.453817	108	50 - 150	0.0000	+/-0.50	
M8PFOS	76850.11	3.636183	76,995.00	3.636183	100	50 - 150	0.0000	+/-0.50	
M9PFNA	512879.3	3.637217	526,406.00	3.637217	97	50 - 150	0.0000	+/-0.50	
MPFDoA	361032.2	4.088634	386,713.00	4.088634	93	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	91828.38	3.9535	101,789.00	3.9535	90	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	107819.7	3.873767	116,586.00	3.873767	92	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
ME-2 (23E3794-02RE1)			Lab File ID: 23E3794-02RE1.d			Analyzed: 06/15/23 16:59			
M8FOSA	63430.73	3.980567	227,522.00	3.980567	28	50 - 150	0.0000	+/-0.50	*
M2-4:2FTS	24893.35	2.562517	27,028.00	2.562517	92	50 - 150	0.0000	+/-0.50	
M2PFTA	364628.1	4.329667	479,880.00	4.329667	76	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	31018.9	3.794817	33,212.00	3.802783	93	50 - 150	-0.0080	+/-0.50	
MPFBA	216959.8	1.058467	256,957.00	1.058467	84	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	98515.74	2.880217	114,902.00	2.880217	86	50 - 150	0.0000	+/-0.50	
M6PFDA	380677.3	3.795333	445,919.00	3.795333	85	50 - 150	0.0000	+/-0.50	
M3PFBS	99833.68	1.9364	104,197.00	1.9364	96	50 - 150	0.0000	+/-0.50	
M7PFUnA	358386.6	3.946033	453,308.00	3.946017	79	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	37812.95	3.437283	27,565.00	3.445283	137	50 - 150	-0.0080	+/-0.50	
M5PFPeA	250487.6	1.757717	276,869.00	1.757717	90	50 - 150	0.0000	+/-0.50	
M5PFHxA	423755.1	2.655	458,596.00	2.646767	92	50 - 150	0.0082	+/-0.50	
M3PFHxS	69592.15	3.218333	68,806.00	3.218333	101	50 - 150	0.0000	+/-0.50	
M4PFHpA	456410.2	3.186933	461,168.00	3.186933	99	50 - 150	0.0000	+/-0.50	
M8PFOA	478276.5	3.453817	508,809.00	3.453817	94	50 - 150	0.0000	+/-0.50	
M8PFOS	68816.74	3.636183	76,995.00	3.636183	89	50 - 150	0.0000	+/-0.50	
M9PFNA	474013.9	3.637217	526,406.00	3.637217	90	50 - 150	0.0000	+/-0.50	
MPFDoA	295467.7	4.088634	386,713.00	4.088634	76	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	71346.97	3.9535	101,789.00	3.9535	70	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	82685.68	3.873767	116,586.00	3.873767	71	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
ME-3 (23E3794-03RE1)			Lab File ID: 23E3794-03RE1.d			Analyzed: 06/15/23 17:06			
M8FOSA	166835.3	3.980567	227,522.00	3.980567	73	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	24394.43	2.562517	27,028.00	2.562517	90	50 - 150	0.0000	+/-0.50	
M2PFTA	343507.3	4.329667	479,880.00	4.329667	72	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	29683.95	3.794817	33,212.00	3.802783	89	50 - 150	-0.0080	+/-0.50	
MPFBA	199579.7	1.066783	256,957.00	1.058467	78	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	95104.96	2.880217	114,902.00	2.880217	83	50 - 150	0.0000	+/-0.50	
M6PFDA	375022.2	3.795333	445,919.00	3.795333	84	50 - 150	0.0000	+/-0.50	
M3PFBS	92953.21	1.9364	104,197.00	1.9364	89	50 - 150	0.0000	+/-0.50	
M7PFUnA	351270.3	3.946033	453,308.00	3.946017	77	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	31350.92	3.437283	27,565.00	3.445283	114	50 - 150	-0.0080	+/-0.50	
M5PFPeA	231561.3	1.757717	276,869.00	1.757717	84	50 - 150	0.0000	+/-0.50	
M5PFHxA	392931.2	2.646767	458,596.00	2.646767	86	50 - 150	0.0000	+/-0.50	
M3PFHxS	64172.11	3.218333	68,806.00	3.218333	93	50 - 150	0.0000	+/-0.50	
M4PFHpA	411807.9	3.186933	461,168.00	3.186933	89	50 - 150	0.0000	+/-0.50	
M8PFOA	450823.7	3.453817	508,809.00	3.453817	89	50 - 150	0.0000	+/-0.50	
M8PFOS	64565.88	3.636183	76,995.00	3.636183	84	50 - 150	0.0000	+/-0.50	
M9PFNA	438212.4	3.637217	526,406.00	3.637217	83	50 - 150	0.0000	+/-0.50	
MPFDoA	287448.7	4.088634	386,713.00	4.088634	74	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	80767.51	3.9535	101,789.00	3.9535	79	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	82407.26	3.873767	116,586.00	3.873767	71	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B342713-BLK1)			Lab File ID: B342713-BLK1.d			Analyzed: 06/15/23 16:01			
M8FOSA	196862.9	3.980567	227,522.00	3.980567	87	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	26152.61	2.562517	27,028.00	2.562517	97	50 - 150	0.0000	+/-0.50	
M2PFTA	427562.6	4.337783	479,880.00	4.329667	89	50 - 150	0.0081	+/-0.50	
M2-8:2FTS	29892	3.794817	33,212.00	3.802783	90	50 - 150	-0.0080	+/-0.50	
MPFBA	249440.2	1.058467	256,957.00	1.058467	97	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	94002.9	2.880217	114,902.00	2.880217	82	50 - 150	0.0000	+/-0.50	
M6PFDA	409812.8	3.795333	445,919.00	3.795333	92	50 - 150	0.0000	+/-0.50	
M3PFBS	105955.5	1.944683	104,197.00	1.9364	102	50 - 150	0.0083	+/-0.50	
M7PFUnA	426348.8	3.946017	453,308.00	3.946017	94	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	26142.75	3.437283	27,565.00	3.445283	95	50 - 150	-0.0080	+/-0.50	
M5PFPeA	274971.8	1.757717	276,869.00	1.757717	99	50 - 150	0.0000	+/-0.50	
M5PFHxA	449201.1	2.655	458,596.00	2.646767	98	50 - 150	0.0082	+/-0.50	
M3PFHxS	65679.15	3.218333	68,806.00	3.218333	95	50 - 150	0.0000	+/-0.50	
M4PFHpA	468079.8	3.186933	461,168.00	3.186933	101	50 - 150	0.0000	+/-0.50	
M8PFOA	511877	3.453817	508,809.00	3.453817	101	50 - 150	0.0000	+/-0.50	
M8PFOS	68250.95	3.636183	76,995.00	3.636183	89	50 - 150	0.0000	+/-0.50	
M9PFNA	486195.3	3.637217	526,406.00	3.637217	92	50 - 150	0.0000	+/-0.50	
MPFDoA	361203.5	4.088634	386,713.00	4.088634	93	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	91567.28	3.9535	101,789.00	3.9535	90	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	109350.9	3.873767	116,586.00	3.873767	94	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B342713-BS1)			Lab File ID: B342713-BS1.d			Analyzed: 06/15/23 15:47			
M8FOSA	177957.5	3.980567	227,522.00	3.980567	78	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	29196.96	2.562517	27,028.00	2.562517	108	50 - 150	0.0000	+/-0.50	
M2PFTA	408424.1	4.329667	479,880.00	4.329667	85	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	28086.29	3.794817	33,212.00	3.802783	85	50 - 150	-0.0080	+/-0.50	
MPFBA	252572.1	1.058467	256,957.00	1.058467	98	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	97688.41	2.880217	114,902.00	2.880217	85	50 - 150	0.0000	+/-0.50	
M6PFDA	395000.1	3.795333	445,919.00	3.795333	89	50 - 150	0.0000	+/-0.50	
M3PFBS	107557.4	1.944683	104,197.00	1.9364	103	50 - 150	0.0083	+/-0.50	
M7PFUnA	394744.1	3.946033	453,308.00	3.946017	87	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	28605.05	3.437283	27,565.00	3.445283	104	50 - 150	-0.0080	+/-0.50	
M5PFPeA	274098.7	1.757717	276,869.00	1.757717	99	50 - 150	0.0000	+/-0.50	
M5PFHxA	460367.3	2.655	458,596.00	2.646767	100	50 - 150	0.0082	+/-0.50	
M3PFHxS	71050.67	3.218333	68,806.00	3.218333	103	50 - 150	0.0000	+/-0.50	
M4PFHpA	467747.6	3.186933	461,168.00	3.186933	101	50 - 150	0.0000	+/-0.50	
M8PFOA	513461.1	3.453817	508,809.00	3.453817	101	50 - 150	0.0000	+/-0.50	
M8PFOS	69476.79	3.636183	76,995.00	3.636183	90	50 - 150	0.0000	+/-0.50	
M9PFNA	496207.2	3.637217	526,406.00	3.637217	94	50 - 150	0.0000	+/-0.50	
MPFDoA	315758.9	4.088634	386,713.00	4.088634	82	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	89045.16	3.9535	101,789.00	3.9535	87	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	94363.59	3.873767	116,586.00	3.873767	81	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS Dup (B342713-BSD1)			Lab File ID: B342713-BSD1.d			Analyzed: 06/15/23 15:54			
M8FOSA	220138.8	3.980567	227,522.00	3.980567	97	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	32367.33	2.562517	27,028.00	2.562517	120	50 - 150	0.0000	+/-0.50	
M2PFTA	441651.6	4.329667	479,880.00	4.329667	92	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	31301.99	3.794817	33,212.00	3.802783	94	50 - 150	-0.0080	+/-0.50	
MPFBA	272321.5	1.058467	256,957.00	1.058467	106	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	118835	2.880217	114,902.00	2.880217	103	50 - 150	0.0000	+/-0.50	
M6PFDA	437059.7	3.795333	445,919.00	3.795333	98	50 - 150	0.0000	+/-0.50	
M3PFBS	114906.1	1.944683	104,197.00	1.9364	110	50 - 150	0.0083	+/-0.50	
M7PFUnA	421543.8	3.946033	453,308.00	3.946017	93	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	32375.59	3.437283	27,565.00	3.445283	117	50 - 150	-0.0080	+/-0.50	
M5PFPeA	296427	1.757717	276,869.00	1.757717	107	50 - 150	0.0000	+/-0.50	
M5PFHxA	497145.6	2.655	458,596.00	2.646767	108	50 - 150	0.0082	+/-0.50	
M3PFHxS	73935.12	3.218333	68,806.00	3.218333	107	50 - 150	0.0000	+/-0.50	
M4PFHpA	510817.8	3.186933	461,168.00	3.186933	111	50 - 150	0.0000	+/-0.50	
M8PFOA	559667.8	3.453817	508,809.00	3.453817	110	50 - 150	0.0000	+/-0.50	
M8PFOS	74508.68	3.636183	76,995.00	3.636183	97	50 - 150	0.0000	+/-0.50	
M9PFNA	545909.5	3.637217	526,406.00	3.637217	104	50 - 150	0.0000	+/-0.50	
MPFDoA	347648.5	4.088634	386,713.00	4.088634	90	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	93566.37	3.9535	101,789.00	3.9535	92	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	109406.2	3.873767	116,586.00	3.873767	94	50 - 150	0.0000	+/-0.50	

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SOP-454 PFAS in Water	
Perfluorobutanoic acid (PFBA)	NH-P,PA
Perfluorobutanesulfonic acid (PFBS)	NH-P,PA
Perfluoropentanoic acid (PFPeA)	NH-P,PA
Perfluorohexanoic acid (PFHxA)	NH-P,PA
11Cl-PF3OUdS (F53B Major)	NH-P,PA
9Cl-PF3ONS (F53B Minor)	NH-P,PA
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	NH-P,PA
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P,PA
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P,PA
Perfluorodecanoic acid (PFDA)	NH-P,PA
Perfluorododecanoic acid (PFDoA)	NH-P,PA
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	NH-P,PA
Perfluoroheptanesulfonic acid (PFHpS)	NH-P,PA
N-EtFOSAA (NEtFOSAA)	NH-P,PA
N-MeFOSAA (NMeFOSAA)	NH-P,PA
Perfluorotetradecanoic acid (PFTA)	NH-P,PA
Perfluorotridecanoic acid (PFTrDA)	NH-P,PA
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P,PA
Perfluorodecanesulfonic acid (PFDS)	NH-P,PA
Perfluorooctanesulfonamide (FOSA)	NH-P,PA
Perfluorononanesulfonic acid (PFNS)	NH-P,PA
Perfluoro-1-hexanesulfonamide (FHxSA)	NH-P,PA
Perfluoro-1-butanesulfonamide (FBSA)	NH-P,PA
Perfluorohexanesulfonic acid (PFHxS)	NH-P,PA
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P,PA
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P,PA
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P,PA
Perfluoropentanesulfonic acid (PFPeS)	NH-P,PA
Perfluoroundecanoic acid (PFUnA)	NH-P,PA
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P,PA
Perfluoroheptanoic acid (PFHpA)	NH-P,PA
Perfluorooctanoic acid (PFOA)	NH-P,PA
Perfluorooctanesulfonic acid (PFOS)	NH-P,PA
Perfluorononanoic acid (PFNA)	NH-P,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2023
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2024

23E3794 KAF

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CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page 1 of 1

Company Name:	Horsley Witten Group
Address:	90 Route 6A Sandwich, MA
Phone:	508-833-6600
Project Name:	HYA
Project Location:	Hyannis, MA
Project Number:	
Project Manager:	Bryan Massa
Pace Quote Name/Number:	
Invoice Recipient:	bmassa@horsleywitten.com
Sampled By:	Caroline Armstrong

Requested Turnaround Time

7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☒ Due Date:

Rush-Approval Required

1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery

Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To:
Fax To #:

Dissolved Metals Samples

○ Field Filtered
○ Lab to Filter

Orthophosphate Samples

○ Field Filtered
○ Lab to Filter

PCB ONLY

SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PFAS (Isotope dilution)
1	ME-1	5/20/23	845	G	W				2			X
2	ME-2	↓	855	G	W				2			X
3	ME-3		850	G	W				2			X

[2] Preservation Code

Courier Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N

Glassware in freezer? Y / N

Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time: 5/30/23 1143	Client Comments:
Received by: (signature) PACE	Date/Time: 5/30/23 1143	
Relinquished by: (signature)	Date/Time: 5/30/23 1606	
Received by: (signature)	Date/Time: 5/30/23 1606	
Relinquished by: (signature)	Date/Time:	
Received by: (signature)	Date/Time:	
Relinquished by: (signature)	Date/Time:	
Received by: (signature)	Date/Time:	

Detection Limit Requirements

MA GW-1
GT
Other:

Special Requirements

☑ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity

Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other

☐ Chromatogram
☐ AIHA-LAP,LLC

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

39 Spruce St.
East Longmeadow, MA. 01028
P: 413-525-2332
F:413-525-6405
www.pacelabs.com

ENV-FRM-ELON-0001 V05__Sample Receiving Checklist

Log In Back-Sheet

Login Sample Receipt Checklist – (Rejection Criteria Listing – Using Acceptance Policy) Any False statement will be brought to the attention of the Client – True or False

Pace
PEOPLE ADVANCING SCIENCE

Client Horsley Witten Group

Project HYA

MCP/RCP Required MA MCP

Deliverable Package Requirement CAM-1

Location Hyannis, MA

PWSID# (When Applicable) NA

Arrival Method:

Courier ☑ Fed Ex ☐ Walk In ☐ Other ☐

Received By / Date / Time GL 5/30/23 1606

~~Back-Sheet By / Date / Time~~ GL 5/30/23 1857

Temperature Method GUN # 2

Temp ☑ < 6° C Actual Temperature 2.4

Rush Samples: Yes / (No) Notify

Short Hold: Yes / (No) Notify

	True	False
Received on Ice	☑	☐
Received in Cooler	☑	☐
Custody Seal: DATE TIME	☐	☑
COC Relinquished	☑	☐
COC/Samples Labels Agree	☑	☐
All Samples in Good Condition	☑	☐
Samples Received within Holding Time	☑	☐
~~Is there enough Volume~~	☑	☐
Proper Media/Container Used	☑	☐
Splitting Samples Required	☐	☑
MS/MSD	☐	☑
Trip Blanks	☐	☑
Lab to Filters	☐	☑
COC Legible	☑	☐

COC Included: (Check all included)

Client ☑ Analysis ☑ Sampler Name ☑

Project ☑ IDs ☑ Collection Date/Time ☑

All Samples Proper pH: (N/A) ☐ ☐

Notes regarding Samples/COC outside of SOP:

Additional Container Notes

Sample	Soils Jars (Circle Amb/Clear)				Ambers							Plastics										VOA Vials					Other / Fill in					
					1 Liter			250mL			100mL	1 Liter		500mL		250mL																
	16oz Amb/Clear	8oz Amb/Clear	4oz Amb/Clear	2oz Amb/Clear	Unpreserved	HCL	Sulfuric	Sulfuric	Phosphoric	HCl	Unpreserved	Unpreserved	Sulfuric	Unpreserved	Sulfuric	Unpreserved	Trizma	Sulfuric	Nitric	NaOH	NaOH/Zinc	Unpreserved	HCl	MeOH	D.I. Water	BiSulfate	Col/Bact					
1																																
2																2																
3																2																
4																3																
5																																
6																																
7																																
8																																
9																																
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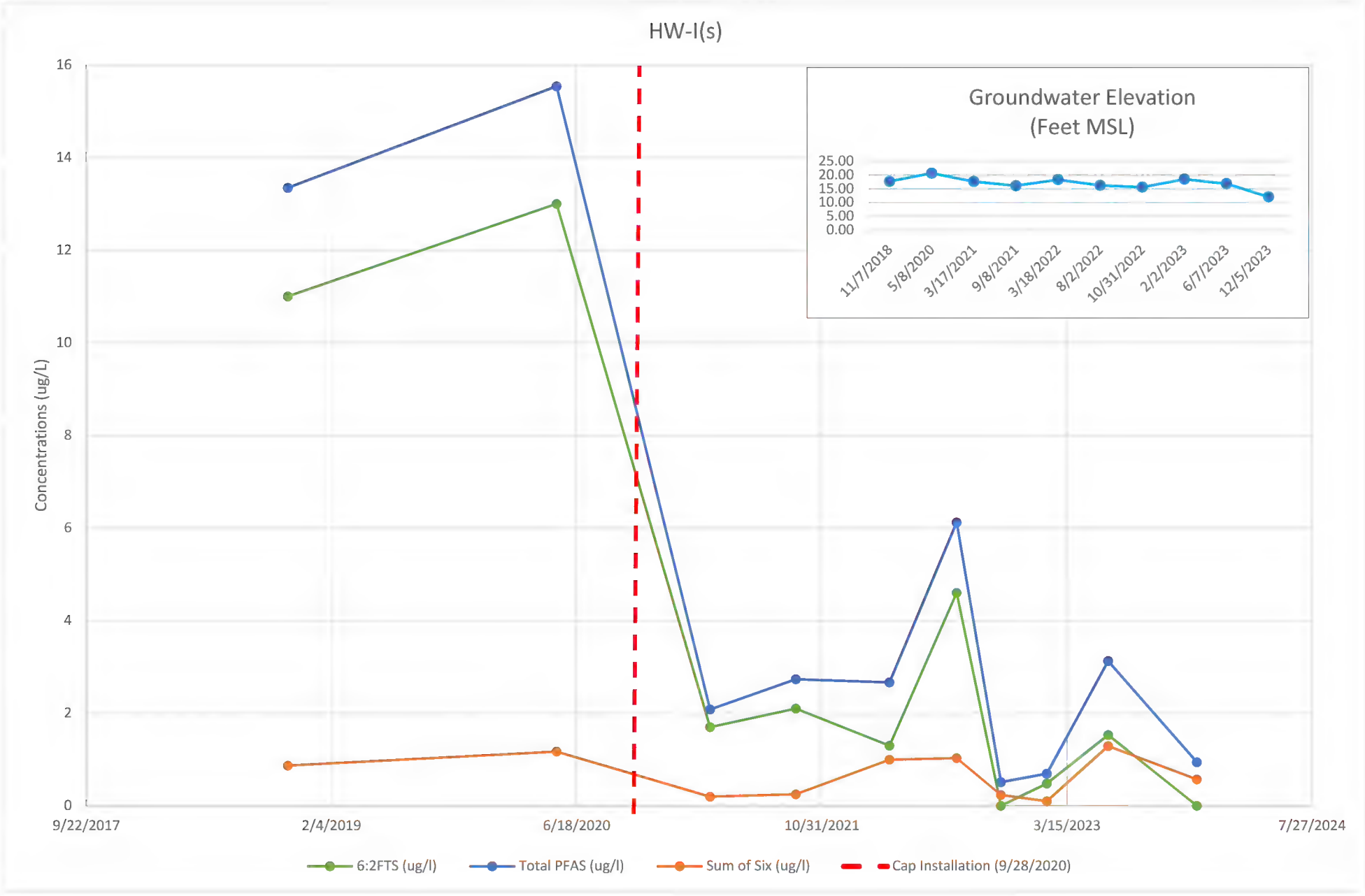
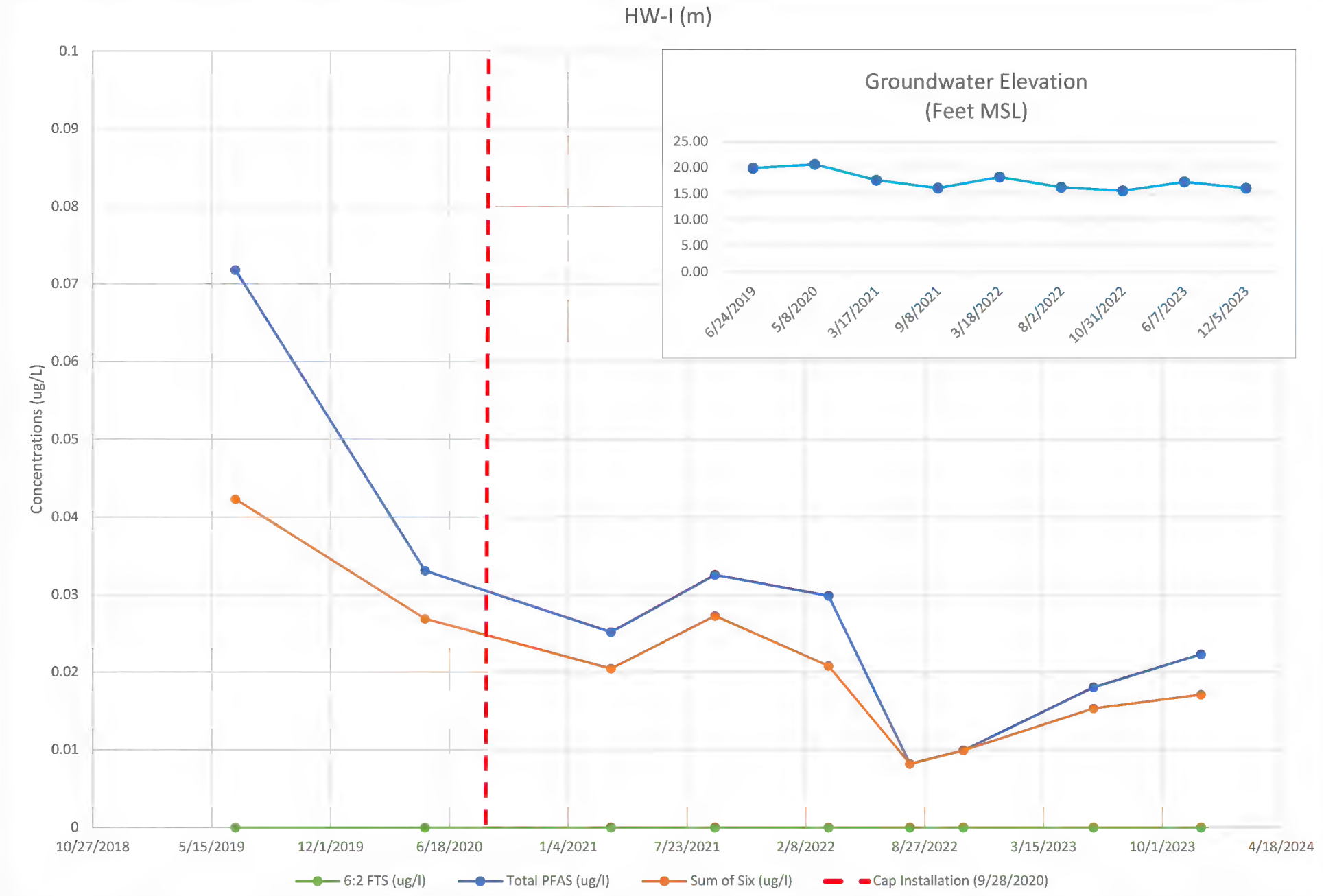
16																																
17																																
18																																
19																																
20																																

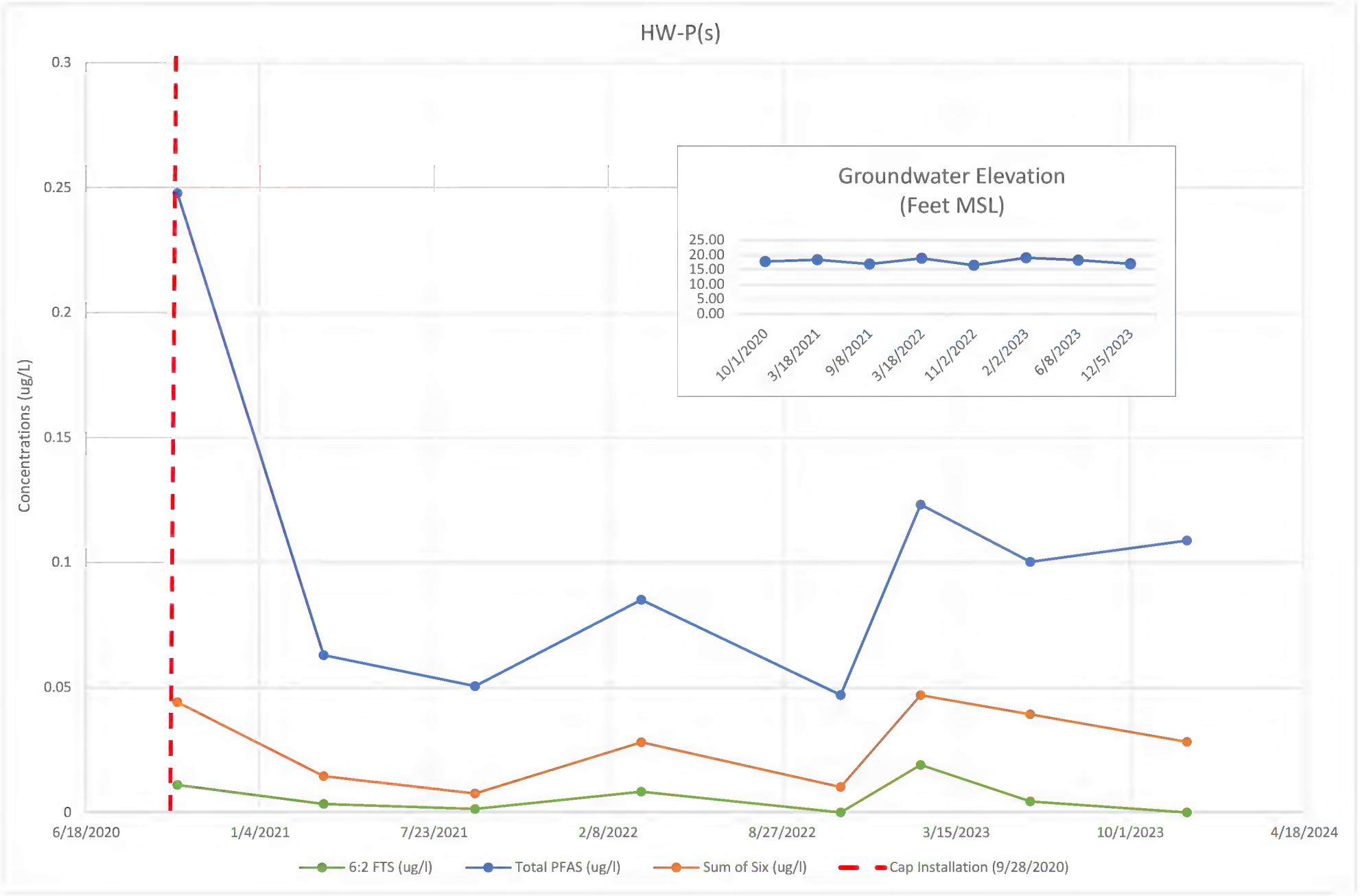
APPENDIX C

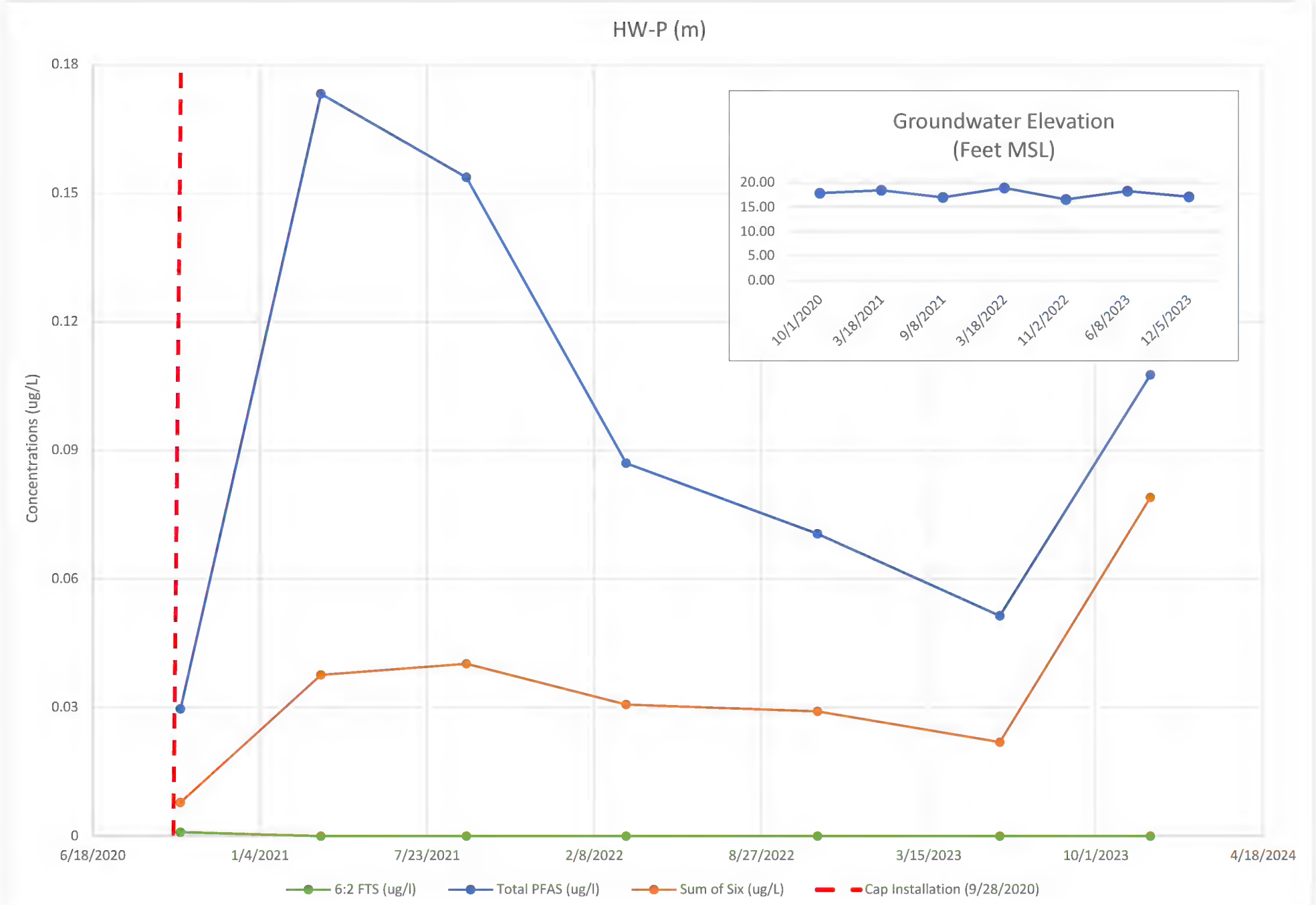
PFAS IN GROUNDWATER CONCENTRATION VS. TIME PLOTS


HW-I(s)
Concentrations (ug/L)
16
14
12
10
8
6
4
2
0
9/22/2017
2/4/2019
6/18/2020
10/31/2021
3/15/2023
7/27/2024
Groundwater Elevation
(Feet MSL)
25.00
20.00
15.00
10.00
5.00
0.00
11/7/2018
5/8/2020
3/17/2021
9/8/2021
3/18/2022
8/2/2022
10/31/2022
2/2/2023
6/7/2023
12/5/2023
6:2FTS (ug/l)
Total PFAS (ug/l)
Sum of Six (ug/l)
Cap Installation (9/28/2020)


HW-I (m)
Concentrations (ug/L)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
10/27/2018
5/15/2019
12/1/2019
6/18/2020
1/4/2021
7/23/2021
2/8/2022
8/27/2022
3/15/2023
10/1/2023
4/18/2024
6:2 FTS (ug/l)
Total PFAS (ug/l)
Sum of Six (ug/l)
Cap Installation (9/28/2020)
Groundwater Elevation
(Feet MSL)
25.00
20.00
15.00
10.00
5.00
0.00
6/24/2019
5/8/2020
3/17/2021
9/8/2021
3/18/2022
8/2/2022
10/31/2022
6/7/2023
12/5/2023


HW-I (d)
Groundwater Elevation
(Feet MSL)
25.00
20.00
15.00
10.00
5.00
0.00
6/24/2019
5/8/2020
3/17/2021
9/11/2021
3/18/2022
8/2/2022
10/31/2022
6/7/2023
12/5/2023
Concentrations (ug/L)
0.42
0.36
0.3
0.24
0.18
0.12
0.06
0
10/27/2018
5/15/2019
12/1/2019
6/18/2020
1/4/2021
7/23/2021
2/8/2022
8/27/2022
3/15/2023
10/1/2023
4/18/2024
6:2 FTS (ug/l)
Total PFAS (ug/l)
Sum of Six (ug/l)
Cap Installation (9/28/2020)


HW-P(s)
Concentrations (ug/L)
0.3
0.25
0.2
0.15
0.1
0.05
0
6/18/2020
1/4/2021
7/23/2021
2/8/2022
8/27/2022
3/15/2023
10/1/2023
4/18/2024
Groundwater Elevation
(Feet MSL)
25.00
20.00
15.00
10.00
5.00
0.00
10/1/2020
3/18/2021
9/8/2021
3/18/2022
11/2/2022
2/2/2023
6/8/2023
12/5/2023
6:2 FTS (ug/l)
Total PFAS (ug/l)
Sum of Six (ug/l)
Cap Installation (9/28/2020)


HW-P (m)
Concentrations (ug/L)
0.18
0.15
0.12
0.09
0.06
0.03
0
6/18/2020
1/4/2021
7/23/2021
2/8/2022
8/27/2022
3/15/2023
10/1/2023
4/18/2024
Groundwater Elevation
(Feet MSL)
20.00
15.00
10.00
5.00
0.00
10/1/2020
3/18/2021
9/8/2021
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6/8/2023
12/5/2023
6:2 FTS (ug/l)
Total PFAS (ug/l)
Sum of Six (ug/L)
Cap Installation (9/28/2020)

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DRINKING WATER PROGRAM
100 CAMBRIDGE STREET, SUITE 900, BOSTON, MA 02114 • (617) 292-5770

2024
Certificate of Registration

The Department of Environmental Protection
Drinking Water Program
Hereby Recognizes the

HYANNIS WATER SYSTEM, TOWN OF BARNSTABLE
PWS ID # 4020004

as a Registered Public Water System in Massachusetts.
Public Water Systems must comply with
the Massachusetts Drinking Water Regulations,
310 CMR 22.00.

Yvette dePeiza, Program Director
Drinking Water Program

Certificate expires December 31, 2024

Please contact the Drinking Water Program if there are any changes in this system.

MassDEP: https://www.mass.gov/massdep-contacts-service-center

Report on Water Quality

The Hyannis Water Board is proud to present its annual water quality report. The statistics in this report are based on testing done throughout 2022 as well as prior years. We hope you will find it helpful to know the sources of your water and the process by which safe drinking water is delivered to your home or business. We have maintained our high standards in an effort to continue delivering the best quality drinking water possible. We remain vigilant in meeting the challenges of source water protection.

Opportunities for Public Participation

We encourage you to share your thoughts with us
on the information contained in this report.
Our meetings are open public meetings.
A schedule of these meetings is posted
on the Town of Barnstable website:
http://www.town.barnstable.ma.us/Hyannis_WaterBoard/?brd=Hyannis+Water+Board.
Should you ever have questions, we are available to assist you.
Call Hans Keijser, Supervisor,
Water Supply Division at **508 775-0063**

Where Does My Water Come From?

The Hyannis Water System supplies the most densely populated residential and commercial areas of Hyannis, Hyannisport, and West Hyannisport comprising approximately 9 square miles. The water is obtained from 11 groundwater wells that are located in the Town of Barnstable and draw water from the Sagamore Lens, part of the Cape Cod Aquifer. The wells are: Airport # 1 (4020004-10g), Hyannisport Well (4020004-03g), Maher Well # 1 (4020004-07g), Maher Well # 2 (4020004-02g), Maher Well # 3 (4020004-11g), Mary Dunn Well # 1 (4020004-04g), Mary Dunn Well # 2 (4020004-05g), Mary Dunn Well # 3 (4020004-08g), Mary Dunn Well # 4 (4020004-09g), Straightway Well (4020004-12g), and the Simmons Pond Well (4020004-06g).

There are also four water storage tanks. Two located on Mary Dunn Road: Mary Dunn Tank # 1 - 370,000 gallons, Mary Dunn Tank # 2 - 1 million gallons, Maher - 800,000 gallons and Straightway - 400,000 gallons.

Water system interconnections are established with the Town of Yarmouth water system and the COMM. water system to have the ability to draw water as a backup water supply.

Hyannis Water System Operations

United Water Environmental Services began operating the Hyannis Water System on July 1, 2009. As of November 16, 2015 United Water was consolidated under Suez and now Veolia. The operations contract includes operations and maintenance of the water treatment plants and the system's pumping stations, cross connection control services, inspection and maintenance of the distribution system, fire hydrants and gate valves, the complete rehabilitation of two system wells per year, hydrant painting, meter installation and maintenance, customer service, billing and all other duties required for the day to day operations of the public water supply treatment and distribution system. Oversight of the contract is provided by the Barnstable Department of Public Works Water Supply Division.

Office Hours

Monday through Friday 8 AM to 5 PM
Saturday 8 AM to 12 PM

In the event of any emergency call:
(508) 775-0063
Staff is available 24/7

Maintaining Water Quality

The Hyannis Water System continuously strives to produce the highest quality water that meets or surpasses water quality standards for safe drinking water. We monitor all our water sources and distribution system very closely. The standards that we operate under were enacted by the U. S. Congress as the Safe Drinking Water Act in 1974 and amended in 1986 and 1996.

To ensure tap water is safe to drink, the Massachusetts Department of Environmental Protection (DEP) and U.S. Environmental Protection Agency (EPA) prescribe regulations that limit the amount of certain contaminants in water provided by all public drinking water systems. The Food and Drug Administration (FDA) and the Massachusetts Department of Public Health regulations establish the limits for contaminants in bottled water to provide the same protection for public health.

The Hyannis Water System meets all primary Water Quality Standards set forth by the United States Environmental Protection Agency and Massachusetts Department of Environmental Protection.

Water Treatment

In our effort to supply safe, clean and healthy water to the Hyannis communities, chemicals are added in safe quantities to ensure that your water quality is consistently maintained.

Many drinking water sources in New England are naturally corrosive (pH of less than 7.0). This can cause active leaching of lead and copper into your water. To reduce this leaching, your water is chemically treated to raise the pH to neutral or slightly alkaline. Testing throughout the Hyannis Water System has demonstrated that this is an effective and safe treatment process.

Past commercial activities near the Hyannis Airport have contributed to the detection of Volatile Organic Compounds (VOCs) in the Maher well field. These chemicals are removed from the water using an aeration process and then adding a disinfectant to the water before it enters the distribution system.

Activated carbon filtration systems are installed on all of the Hyannis Water System wells to remove PFAS contamination.

All chemicals used for the corrosion control are approved for water treatment by one or more of the following organizations: National Sanitation Foundation (NSF International) or Underwriters Laboratory, both accredited by the American National Standards Institute (ANSI). Chemicals also must meet the performance standards established by the American Water Works Association.

Hyannis Water System

The Hyannis Water System is operated and
maintained by a private company, Veolia,
with oversight provided by the Town of Barnstable
Department of Public Works, Water Supply Division.

Questions about this report

Please contact:
Hans Keijser, Supervisor, Water Supply Division
508-775-0063

This report was prepared by Veolia for the Hyannis Water System. Additional copies of this report are available upon request; please contact (508) 775-0063 for additional copies.

Information for Persons with Compromised Immune Systems

Some people are more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons, such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC (Center for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the **Safe Drinking Water Hotline (800) 426-4791 or www.epa.gov/safewater/hotline.**

The Hyannis Water System was commended by the Massachusetts DEP for posting water protection signs, acquiring and protecting land within Zone I areas, and working with the Town of Yarmouth to protect Zone II areas.

In conjunction with its certified operator, Veolia, the Hyannis Water System is addressing the concerns stated in the SWAP Report and welcomes your input to our planning. If you have questions, please contact Kevin Sampson at (508) 775-0063

Source Water Assessment and Protection

The Massachusetts DEP has prepared a Source Water Assessment Program (SWAP) Report for the Hyannis Water System. The report assesses the susceptibility of public water supplies to contamination and makes recommendations. This report is available from the Hyannis Water System located at 47 Old Yarmouth Road in Hyannis, the local Board of Health and also at the DEP website: **http://www.mass.gov/dep/water/drinking/sourcewa.htm#reports.**

A susceptibility ranking of HIGH was assigned to all wells in our system by the DEP due to the absence of hydrogeologic barriers, i.e., clay, in the Cape Cod Aquifer. There are activities and land uses within the Zone I, a 400 ft. radius around each well head, and the Zone II, the aquifer recharge area, that can contribute to drinking water contamination. Examples include local roads and power line easements in the Zone I, transportation corridors, residential septic systems, heating oil storage, household hazardous materials usage and storage, and stormwater from roads and lawns within the Zone II.

The Hyannis Water System was commended by the Massachusetts DEP for posting water protection signs, acquiring and protecting land within Zone I areas, and working with the Town of Yarmouth to protect Zone II areas.

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The Hyannis Water System was commended by the Massachusetts DEP for posting water protection signs, acquiring and protecting land within Zone I areas, and working with the Town of Yarmouth to protect Zone II areas.

2022 Hyannis Water System improvements

In 2022 the Hyannis Water System's capital improvements dealt with the 12 inch water main replacement on Phinney's Lane in conjunction with the sewer expansion and Vineyard Wind conduit installation project. The water mains at the intersection of Route 28 and Yarmouth Road were replaced as part of the Mass DOT intersection improvements.

Fire Service Installation

How Many Times a Day Do You Turn on the Faucet?

The average American home uses about 100 to 130 gallons of water a day. Did you know that only 1% of our in-home water use is for drinking? The majority of our daily water consumption, about 75%, is used in the bathroom. Did you know that 14% of in-home water use is wasted by leaking taps and toilets? Conserving water is as simple as repairing leaky faucets and toilets, taking shorter showers, not leaving water running while brushing teeth, washing hands, washing fruits and vegetables. Learn more about using water wisely at www.USEPA/WaterSense.

Using water wisely benefits you and the environment.

Este relatório contém informações importantes sobre a água potável. Ter alguém que traduzi-lo para você, ou falar com alguém que entende-lo.

The night-time installation of a 3-way valve cluster during a snow event in Hyannis

Water testing performed in calendar year 2022

Hyannis Water System
PWS ID: #4020004

WATER QUALITY REPORT

ANNUAL

Hyannis Water System
Operated by Veolia
47 Old Yarmouth Road
Hyannis, MA 02601-0326
(508) 775-0063

SEAL OF THE TOWN OF BARNSTABLE, MASS. 1639. ADOPTED MAY 4, 1868

Hyannis Water Board
Samuel Wilson, Chair
Amy Wrightson, Vice-chair
Jonathan Laxtimer, Member
Louise O'Neil, Member
Timothy Stump, Member

DISTRIBUTION SYSTEM WATER QUALITY

This report summarizes only those items detected during sampling - not all contaminants that are monitored

Microbial Results	Highest % Positive in a Month	Range Detected	MCL	MCLG	Violation	Possible Source of Contamination
Total Coliform Bacteria **	0.0%	0%	>5% Monthly Samples Positive	0	No	Naturally present in the environment
E.coli (in ground water source) **	1 Positive sample	ND-1	TT	N/A	No	Human and animal fecal waste

***Compliance with the Fecal Coliform / E.coli MCL is determined upon additional repeat testing.**

****Total Coliform:** We were notified on 10/04/2022 of an E.coli positive sample in the raw water sample from Maher well 2 (O2-G). You may remember receiving public notice of this violation on 10/04/2022. Because of this we took Maher Well 2 (O2-G) off-line on 10/04/2022 for one day till the results of the 5 samples were known. ** On 10/04/2022 We took 5 repeat samples at Maher Well 2 (O2-G) for E.coli on 10/04/2022. We were notified by the lab on 10/05/2022 that all 5 samples were absent for E.coli. We were in contact with MASS DEP and they permitted us to put Maher Well 2 (O2-G) back on-line.

. **Health Effects:** Fecal coliform and E. coli are bacteria whose presence indicates that the water maybe contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a health risk for infants, young children, some elderly, and people with severely compromised immune systems.

Lead & Copper	Dates Collected	90th Percentile	Action Level	MCLG	# of Sites samples	# of Sites Above Action Level	Violation	Possible Source of Contamination
Lead (ppm)	4/07/2022-4/21/2022	0	0.015	0	30	0	No	Corrosion of household plumbing systems: Erosion of natural deposits
Copper (ppm)	4/07/2022-4/21/2022	0.63	1.3	1.3	30	0	No	Corrosion of household plumbing systems: Erosion of natural deposits

TESTING FOR LEAD - If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. **Hyannis Water System** is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

SUMMARY OF FINISHED WATER CHARACTERISTICS

Regulated Contaminants	Date(s) Collected	Highest Detect Value	Range Detected	MCL	MCLG	Violation	Possible Source of Contamination
Inorganic Contaminants:							
Barium (ppm)	4/13/22	0.03	N/A	2	2	No	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Cadmium (ppm)	4/13/22	ND	N/A	0.004	0.005	No	Corrosion of galvanized pipes;erosion of natural deposits;discharge from metal refineries;runoff from waste batteries and paints
Sodium** (ppm)	4/13/22	76	N/A		20		Road salting; erosion of natural deposits
Arsenic (ppm)	4/13/22	ND	ND - 0.001	0.01	0.1	No	Run off from orchards; and from glass& electronics production wastes. Erosion of natural deposits.
Fluoride (ppm)	4/13/22	0.054	N/A	4	4	No	Discharge from fertilizer and aluminum factories; erosion of natural deposits.
Selenium (ppm)	4/13/22	ND	ND - 0.002	0.05	0.05	No	Discharge from petroleum and metal refineries;Erosion of natural deposits; Discharge from mines
Nitrate* (ppm)	10/19/22	4.4	ND-4.4	10	10	No	Runoff from fertilizer use: leaching from septic tanks; sewage; erosion of natural deposits
Perchlorate*** (ppb)	8/3/22	0.25	0.091-0.25	2	-	No	Rocket propellants, fireworks, munitions, flares, blasting agents (see note below)*
*Nitrate	Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant, you should ask for advice from your health care provider.						
**Sodium	Sodium is a naturally-occurring common element found in soil and water. It is necessary for the normal functioning of regulating fluids in human systems. Some people, however, have difficulty regulating fluid volume as a result of several diseases, including congestive heart failure and hypertension. The guideline of 20mg/L for sodium represents a level in water that physicians and sodium sensitive individuals should be aware of in cases where sodium exposures are being carefully controlled. For additional information, contact your health care provider, your local board of health or the Massachusetts Department of Public Health, Bureau of Environmental Health Assessment at 617-624-5757.						
***Perchlorate (Various Chemical Abstract Service Registry Numbers (CASRN) for different chemical species)	Perchlorate interferes with the normal function of the thyroid gland and thus has the potential to affect growth and development, causing brain damage and other adverse effects, particularly in fetuses and infants. Pregnant women, the fetus, infants, children up to the age of 12, and people with a hypothyroid condition are particularly susceptible to perchlorate toxicity. 'J' values are required when the results are above the MDL(0.012) and below the MRL(0.05)						
Organic Contaminants:							
Tetrachloroethylene (PCE) (ppb)	02/23/2022-7/19/2022	0.51	ND - 0.51	5	-	No	Discharge from factories and dry cleaners
Bromodichloromethane (ppb)	7/19/22	ND	ND	NA	NA	No	By-product of drinking water chlorination
Chlorodibromomethane ppb)	7/19/22	ND	ND	NA	NA	No	By-product of drinking water chlorination
Dibromochloromethane	7/19/22	ND	ND	NA	NA	No	By-product of drinking water chlorination
Bromoform (ppb)	7/19/22	ND	ND	NA	NA	No	By-product of drinking water chlorination
Chloroform (ppb)	7/19/22	ND	ND	ORSG 70	NA	No	By-product of drinking water chlorination
Stage 2 Disinfectants and Disinfection Byproducts							
Chlorine (ppm)	4th Quarter	0.91	0.76-0.91	4	4	No	Water additive used to control microbes
TTHMs (Stage 2) [Total Trihalomethanes] (ppb)	Quarterly	8.2	ND-8.2	80	-	No	By-product of drinking water chlorination
HAA5s (Stage 2) Haloacetic Acids (HAA5) (ppb)	Quarterly	1.8	ND - 1.8	60	-	No	By-product of drinking water chlorination (TT)

** Note highest detected value is highest Running Annual Average (RAA). ***Local Running Annual Average

* Note: THM ,HAA and Chlorine minimum and maximum levels in the ranges of results are site specific.

Secondary Contaminants	Date(s) Collected	Highest Detect Value	Range Detected	SMCL	ORSG	Possible Source of Contamination
Magnesium (ppm)	9/27/22	4.1	1.8-4.1	-	-	Natural Mineral and Organic Matter
Chloride (ppm)	9/27/22	82	ND-82	250	NA	Natural Mineral, Road Salt
Calcium (ppm)	9/27/22	13	2.1-13	-	-	Natural Mineral and Organic Matter
Copper (ppm)	9/27/22	0	ND	1	-	Naturally occurring element;corrosion of household plumbing
Iron (ppm)	9/27/22	0	ND	0.3	NA	Erosion of Natural Deposits, and oxidation of iron components
Manganese (ppm)*	9/27/22	0.04	0.01-0.04	0.05	0.3	Erosion of Natural Deposits
Potassium (ppm)	9/27/22	3.2	1.6-3.2	-	-	Natural Mineral and Organic Matter
Sulfate (ppm)	9/27/22	19	ND - 19	250	250	Natural Sources
Alkalinity (ppm)	9/27/22	16	ND-16	-		Natural Sources
Odor (ton)	9/27/22	0	0	3		Naturally occurring organic materials that form ions when in water; seawater influence
Hardness (ppm)	9/27/22	49	12.6-49	-		Natural Sources
Total Dissolved solids (ppm)	9/27/22	320	220-320	500		Runoff and leaching from natural deposits; seawater influence
PH	9/27/22	7.3	7.2-7.3	6.5-8.5		Runoff and leaching from natural deposits; seawater influence
Turbidity (NTU)	9/27/22	ND	ND	-		Soil runoff
Zinc (ppm)	9/27/22	0.11	0.09-0.11	5	NA	Erosion of Natural Deposits, and Industrial Discharge

*EPA has established a lifetime health advisory (HA) for manganese at 0.3ppm and an acute at 1ppm

UCMR3 EPA unregulated contaminants	Date(s) Collected	Highest Detect Value	Range Detected	Average Detected	ORSG	Possible Source of Contamination
1,4-Dioxane (ppb)	Quarterly(2022)	0.23	ND - 0.23	0.060	0.3 ppb	Solvent or stabilizer used in processing of paper, cosmetics, shampoos, coolant

Third Unregulated Contaminant Monitoring Rule (UCMR3)
IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER - Availability of Monitoring Data for Unregulated Contaminants for Hyannis Water System
As required by US Environmental Protection Agency (EPA), our water system has sampled for a series of unregulated contaminants. Unregulated contaminants are those that don't yet have a drinking water standard set by EPA. The purpose of monitoring for these contaminants is to help EPA decide whether the contaminants should have a public health protection standard. As our customers, you have a right to know that these data are available. If you are interested in examining the results, please contact Hans Keijser at (508) 775-0063 or 47 Old Yarmouth Road Hyannis, MA 02601.
This notice is being sent to you by the Hyannis Water System. State Water System ID#: 4020004.
For more information visit the AWWA FAQ UCMR 3 link: http://www.drinktap.org/home/water-information/water-quality/ucmr3.aspx

CCR Regulated Chart for PFAS detects in 2022

Regulated Contaminant	Date(s) Collected	Range Detected ppt	Average Detected ppt	MCL ppt	Possible Source of Contamination	Health Effects
PFOS, PFOA, PFNA, PFHxS, PFHpA,PFDA	Quarterly	ND	0.23 *	20	Man-made chemicals. Used as surfactants to make products stain or water resistant, in fire-fighting foam, for industrial purposes, and as a pesticide. Used in fluoropolymers (such as teflon) cosmetics, greases and lubricants, paints, adhesives and photographic films. PFOS U.S. manufacturing phased out in 2002; PFOS may still be generated incidentally or in imported products.	Long-term exposure to PFOS and PFOA in drinking water may affect the liver, cholesterol and thyroid hormone levels. Some studies indicate that exposure to elevated levels of PFOS and PFOA could cause immunological effects, developmental effects and some types of cancer in laboratory animals. Scientists are working to better understand the degree of risk to people. Based on studies of laboratory animals and chemical similarity to PFOS and PFOA depending on the level and length of exposure, PFNA, PFHxS, PFHpA and PFDA in drinking water may affect the liver, cholesterol levels, thyroid and immune system and may cause developmental effects.
PerfluoroHexanoic (PFHxA)	Quarterly	ND-4.38	0.96	**	Man-made chemical; used in products to make them stain, grease, heat and water resistant.	Based on studies of laboratory animals, people exposed to elevated levels of PFHxA for several years could experience effects on the liver. It is less toxic and is cleared from the body much faster than PFOS, PFOA and other longer-chain PFAS.

On October 2, 2020, the Massachusetts Department of Environmental Protection (MassDEP) published final regulations establishing a drinking water standard, or a Maximum Contaminant Level (MCL), for the sum of six per- and polyfluoroalkyl substances (PFAS). The MCL is 20 parts per trillion (ppt) for what the regulations call PFAS6, or the sum of six PFAS compounds: perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorohexane sulfonic acid (PFHxS), perfluorononanoic acid (PFNA), perfluoroheptanoic acid (PFHpA), and perfluorodecanoic acid (PFDA). PFAS are a family of chemicals widely used since the 1950s to manufacture common consumer products. They have been linked to a variety of health risks, particularly in women who are pregnant or nursing, and in infants. In using the sum of six PFAS compounds, the new standard protects public health for sensitive subgroups including pregnant women, nursing mothers and infants. Please consult your health practitioner if you have any health related questions. For a consumer factsheet on PFAS see: https://www.mass.gov/doc/massdep-fact-sheet-pfas-in-drinking-water-questions-and-answers-for-consumers/download

* Running Annual Average** There is no ORS Guidline or UCMR3 reference concentration health benchmark for this compound. However, the Minnesota Department of Health established a drinking water guidance value of 2,000 ppt for PFBS. See http://www.health.state.mn.us/divs/eh/risk/guidance/gw/pfbsinfo.pdf. EPA also has draft toxicity assesments for PFBS at https://www.epa.gov/pfas/genx-and-draft-toxicity-assesments

SAFE DRINKING WATER ACT – WATER QUALITY STANDARD DEFINITIONS

Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

HA: Health Advisory.

Massachusetts Maximum Contaminant Levels (MMCL): The Massachusetts maximum contaminants listed in the drinking water regulations consist of promulgated US EPA MCLs which have become effective, plus a few MCLs set specifically by Massachusetts.

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Minimum Detection Limit (MDL): Is the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte is greater than zero.

Secondary Maximum Contaminant Level (SMCL): These standards are developed to protect the aesthetic qualities of drinking water and are not health based.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of disinfectant is necessary for control of microbial contaminants

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectant to control microbial contamination.

Primary Standards: Federal drinking water regulations for substances that are health-related. Water suppliers must meet all primary drinking water standards.

Secondary Standards: Federal drinking water measurements for substances that do not have an impact on health. These reflect aesthetic qualities such as taste, odor and appearance. Secondary standards are recommendations, not mandates.

Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.

Massachusetts Office of Research and Standard Guideline (ORSG): This is the concentration of a chemical in drinking water, at or, below which, adverse, non-cancer health effects are unlikely to occur after chronic (lifetime): exposure. If exceeded, it serves as an indicator or the potential for further action.

Third Unregulated Contaminant Monitoring Rule (UCMR3): As required by US Environmental Protection Agency (EPA), our water system has sampled for a series of unregulated contaminants. Unregulated contaminants are those that don't yet have a drinking water standard set by EPA. The purpose of monitoring for these contaminants is to help EPA decide whether the contaminants should have a public health protection standard.

KEY

CU: Color unit.

NA: Not applicable.

ND: Not detected.

Ug/L: Micrograms per liter=ppb

ppb: Parts per billion. The equivalent of one second in 32 years.

ppm: Parts per million. The equivalent of one second in 12 days.

ppt: Parts per trillion.

pCi/L: Picocuries per liter. The Equivalent of one second in 32 million years.

NTU: Nephelometric Turbidity Unit.

TON: Threshold Odor Number.

TI: Treatment Technique.

Water Source Characteristics

The sources of drinking water (for both tap and bottled water) include rivers, lakes, streams, ponds, springs, reservoirs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals, and, in some cases, radioactive materials, and can pick up substances resulting from the presence of animals or human activity.

Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewer treatment plants, septic systems, agricultural livestock operations and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban storm water runoff and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production. These contaminants can also come from gasoline storage, urban storm water runoff, and septic systems.
- Radioactive contaminants, which can be naturally occurring or be the result of oil or gas production and mining activities.

For Your Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at (800) 426-4791.

Where to go for more information: The Massachusetts DEP at (617) 292-5885 or www.state.ma.us/dep or the Massachusetts Drinking Water Education Partnership at www.madwep.org.